metal
the news digest magazine

Volume XXVI - No. 11 November, 1953

MORE FOR YOUR MONEY
HOLDEN SALT BATHS and INDUSTRIAL POT FURNACES

Holden Type 701 Electrode Furnaces
. . . provide these Important Advantages

1 **Electrodes are completely separated** from the working area of the furnace. The brick structure is so designed that it is impossible for work to come into contact with electrodes, either in the basket or work holding fixture.

2 **Electrodes are easily replaceable.** The overhanging ledge permits repair or replacement without disturbing the refractory.

3 **No water cooling of the furnace wall** is required, so there is no power loss with this design.

4 **Split design electrode assembly,** an exclusive development of the Holden Company, provides 80% more area over which to carry secondary current.

5 **A 15 to 20% improved efficiency** is possible when this type electrode assembly plus the flexible braid for transmission of secondary power is used on competitive furnaces.

6 **A single bolt connection for water cooling** the electrode assemblies prevents oxidation of the copper to copper connection. Similarly with such water cooling of these terminals there is no possibility of inducing the heat from the furnace back to the transformer.

● SAVE ONE THIRD On Your Present Furnace

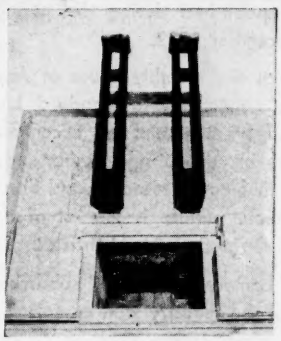
Any competitive furnace using the older type construction can be converted to this design with an electrical saving of approximately 33 1/3%.

INVESTIGATE THE HOLDEN LEASE PLAN

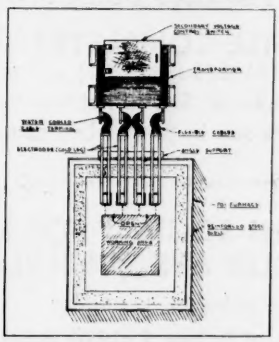
1. It will save you **one-third** over direct purchase and depreciation.
2. No capital investment required.

For full information, write or phone:
J. B. Carey — at Detroit — Texas 4-8127
M. R. Boyle — at New Haven — State 7-5885

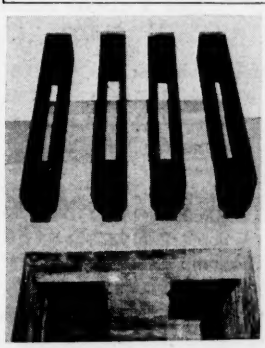
★ *Write for descriptive literature on Holden Type 701 Electrode Furnace.*



HOLDEN TYPE 701-2 Submerged Electrode Unit with removable electrodes.



Drawing of HOLDEN TYPE 701-4 Submerged Electrode Furnace.



HOLDEN TYPE 701-4 Submerged Electrode Unit with replaceable electrodes.

THE A. F. HOLDEN COMPANY

THREE F.O.B. POINTS — LOS ANGELES, DETROIT and NEW HAVEN

VOLUME 9

REVIEW OF METAL LITERATURE

9437 abstracts; 977 pages; accompanied by subject index, author index, and publication index

$10.00 to A.S.M. members; $15 to nonmembers

The yearly editions of the A.S.M. Review of Metal Literature are your reference key to all published information on metals and the metal industry. Volume 9 contains a complete survey of all the metallurgical literature published during the period January through December 1952.

Reprinted from the monthly issues of *Metals Review*, they are collected into standard book size (6 x 9, red cloth binding) and are accompanied by over 200 pages of subject and author index, thus constituting an invaluable research and library tool. Another convenient feature is the list of addresses of publishers of the periodicals abstracted.

The table of contents lists the 19 subdivisions and classifications of the industry with explanatory notes on each. The classification is based on the ASM-SLA Metallurgical Literature Classification, perfected by a joint committee of the American Society for Metals and the Special Libraries Association. This logical and practical arrangement of the subject matter in the book is supplemented by a complete subject index liberally sprinkled with cross-references, for quickly and easily locating the information you need on any phase of metallurgy.

The abstracts are better designated as annotations, since they are brief notes indicative of the contents and not a substitute for a reading of the article or book. All of these brief digests were prepared by the expert librarians and abstracters on the staff of Battelle Memorial Institute. The extensive holdings in the Battelle library insure a complete coverage of both domestic and foreign literature.

IS YOUR FILE COMPLETE? Copies of the first eight volumes of the A.S.M. Review of Metal Literature (1944 through 1951) are still available at the same price as the present volume ($10 to A.S.M. members; $15 to nonmembers). Make your file complete and order the back issues while they are still in print. Use coupon to order—now.

.....CLIP AND MAIL.....

AMERICAN SOCIETY FOR METALS
7301 EUCLID AVE., CLEVELAND 3, OHIO

Please enter my order for:

_____Copies of Volume 9 (1952) A.S.M. Review of Metal Literature
@ $10.00 . . . A.S.M. member; $15.00 . . . nonmember

_____copies of back issues:

_____Volume 8 (1951)	@ $10.00	@ $15.00 . . .
_____Volume 7 (1950)	@ $10.00	@ $15.00 . . .
_____Volume 6 (1949)	@ $10.00	@ $15.00 . . .
_____Volume 5 (1948)	@ $10.00	@ $15.00 . . .
_____Volume 4 (1947)	@ $10.00	@ $15.00 . . .
_____Volume 3 (1946)	@ $10.00	@ $15.00 . . .
_____Volume 2 (1945)	@ $10.00	@ $15.00 . . .
_____Volume 1 (1944)	@ $10.00	@ $15.00 . . .

Name _____ **Chapter Affiliation** _____
Address _____
City _____ **Zone** _____ **State** _____
Bill Me _____ **Bill my firm** _____
Check Enclosed _____

Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXVII, No. 11 November, 1953

MARJORIE R. HYSLOP, Editor
BETTY A. BRYAN, Associate Editor
RAY T. BAYLESS, Publishing Director
GEORGE H. LOUGHNER, Production Manager
A. P. FORD, Advertising Manager

• • •

DISTRICT MANAGERS

Donald J. Billings
7301 Euclid Ave., Cleveland 3, Ohio
UTah 1-0200

John F. Tyrrell
John B. Verrier, Jr.
55 West 42nd St., New York 36
CHickering 4-2713

Ralph H. Cronwell,
964 West Villa Drive, Des Plaines, Ill.
VAnderbilt 4-1206

• • •

Published monthly by the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio: James B. Austin, President; George Roberts, Vice-President; W. A. Pennington, Treasurer; W. H. Eisenman, Secretary; H. B. Knowlton, A. O. Schaefer, G. M. Young, Robert Raudebaugh, Trustees; Ralph L. Wilson, Past President. Subscriptions $5.00 per year ($6.00 foreign). Single copies $1.00. Entered as Second Class Matter, July 26, 1930 at the Post Office at Cleveland, Ohio, under the Act of March 3, 1879.

Claims for missing numbers will not be allowed if received more than 60 days from date of issue. No claims allowed from subscribers in Central Europe, Asia or the Pacific islands other than Hawaii, or because of failure to notify the circulation department of a change of address or because copy is "missing from files".

CONTENTS

Metal Congress and Exposition—Review 4
What the Science Teachers Are Doing 11
1953 Metallographic Exhibit Award Winners 14
ASM-SLA Literature Classification Review 18

IMPORTANT MEETINGS

Safety Factors in Heat Treating, by George Leitch 8
Gas Cleaning in Blast Furnaces, by G. Paul Burks 9
Carbonitriding, by Carl F. Floe 9
Designing to Prevent Corrosion, by R. B. Mears 10
Physical Metallurgy in Aircraft, by R. Smallman-Tew 15
Machinability, by F. E. Dreves 16

DEPARTMENTS

Important Meetings ..... 17, 19 New Films 19
Employment Service Bureau 53

ASM REVIEW OF METAL LITERATURE

A — GENERAL METALLURGICAL 20
B — RAW MATERIALS AND ORE PREPARATION 21
C — NONFERROUS EXTRACTION AND REFINING 22
D — FERROUS REDUCTION AND REFINING 23
E — FOUNDRY 26
F — PRIMARY MECHANICAL WORKING 28
G — SECONDARY MECHANICAL WORKING 29
H — POWDER METALLURGY 30
J — HEAT TREATMENT 31
K — JOINING 32
L — CLEANING, COATING AND FINISHING 34
M — METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES 38
N — TRANSFORMATIONS AND RESULTING STRUCTURES 40
P — PHYSICAL PROPERTIES AND TEST METHODS 41
Q — MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATIONS 42
R — CORROSION 46
S — INSPECTION AND CONTROL 49
T — APPLICATION OF METALS IN EQUIPMENT AND INDUSTRY 50
V — MATERIALS 52

national metal congress and exposition—1953

Reported by Myron Weiss

Special Reporter

THE NATIONAL Metal Congress and Exposition in Cleveland in October broke all preceding records of attendance; 50,858 metallurgists and associated industrialists registered during the show, as compared to 43,301 registered in Philadelphia in 1952. Clocked attendance reached 111,061. Jamming Cleveland's Public Auditorium to complete capacity were 462 exhibitors who unveiled their newest and most improved products, featuring invaluable new techniques and services to make easier, better and cheaper the production tasks of the metals industry. Practically every phase of metals and metalworking was on display at the Exposition.

Participating with the American Society for Metals in the National Metal Congress were the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, the American Welding Society, the Society for Nondestructive Testing and the Metals Division of the Special Libraries Association. Engineering sessions, seminars and educational lectures were conducted during the week by the various societies, sharing their metallurgical knowledge and know-how with their colleagues. Many of the A. S. M. technical lectures appeared as abstracts in the October issue of *Metal Progress,* and all the papers will be published in their entirety in the annual volume of the *Transactions.*

The Edward deMille Campbell Memorial Lecture was given this year by Donald S. Clark, professor of mechanical engineering, California Institute of Technology, who spoke on "The Behavior of Metals Under Dynamic Loading" at the Annual Meeting of the Society. *Metal Progress* for November printed Dr. Clark's paper in extenso.

Education

This year 27 schools were represented in the growing number of alumni luncheons held annually, an indication that the National Metal Congress presents a good opportunity to renew old acquaintances among college classmates. And, of greatest importance, attendance at the luncheons which are held during the Congress, shows that engineers are vitally interested in keeping abreast of the metallurgical research and developments being disseminated at the technical meetings held by the cooperating societies.

Luncheons were held by: Carnegie Institute of Technology, Case Institute of Technology, University of Cincinnati, Columbia University, Cornell University, Fenn College, Illinois Institute of Technology, University of Kentucky, Lafayette College, Lehigh University, Massachusetts Institute of Technology, University of Michigan, Michigan State College, University of Minnesota, Missouri School of Mines and Metallurgy, University of Notre Dame, Ohio State University, University of Pennsylvania, Pennsylvania State College, University of Pittsburgh, Purdue University, Rensselaer Polytechnic Institute, South Dakota School of Mines and Technology, Stevens Institute of Technology, University of Wisconsin, Worcester Polytechnic Institute and Yale.

Young Engineers' Day, held on the last day of the Exposition, attracted over 2250 engineering students from 11 colleges and universities in Ohio and Pennsylvania. These students were transported to the Show on chartered buses and treated to a buffet luncheon through the courtesy of the American Society for Metals. The visit gave the students a splendid opportunity to see educational theories put into practical operation.

MELLON INSTITUTE
LIBRARY

Students from Carnegie Institute of Technology, Case Institute of Technology, College of Steubenville, Fenn College, Grove City College, Ohio Northern University, Ohio State University, University of Akron, University of Pittsburgh and Toledo, and Youngstown College, were invited.

Teaching awards of $2000 each were presented to three professors for their noteworthy contributions to the field of metallurgical education. Awards went to: Otto Zmeskal, professor of metallurgy and chairman of the department of metallurgical engineering, Illinois Institute of Technology; A. W. Schlechten, professor of metallurgical engineering, Missouri School of Mines and Metallurgy; and William Armstrong, associate professor of metallurgy, University of British Columbia. The awards, set up in 1952 by A. S. M. to recognize outstanding leadership in the classroom and laboratory, and in a measure reward the teaching profession by wider acceptance and prestige so greatly needed by outstanding teachers, will be presented annually to candidates, who must be under 40 years of age, who are chosen on the basis of their knowledge and enthusiasm for their subject, and who have demonstrated their ability to impart that knowledge and enthusiasm to their students.

Metallographic Exhibit

The Eighth Metallographic Exhibit attracted entries from abroad as well as the United States and Canada. The exhibit reflected the increasingly wide use and acceptance of metallography as an adjunct for exact metal engineering. The exhibits this year, many of which were in color, reflected the great care and skill on the part of the metallographers in preparing their entries. Complete list of the winning exhibits is on p. 14.

Awards

At the annual banquet of the American Society for Metals, awards were presented as follows: Hiland G. Batcheller, chairman of the board of Allegheny-Ludlum Steel Corp., received the Medal for the Advancement of Research, which is presented annually to an executive in an industrial organization, the principal activity of which is the production or fabrication of metals. The recipient shall be one who, over a period of years, has consistently sponsored metallurgical research or development, and by his foresight and influence in making available financial support, has helped substantially to advance the arts and sciences related to metals. In his acceptance speech, Dr. Batcheller paid tribute to the countless number of engineers and skilled technicians whose work was behind his efforts and who "really deserve" the medal, which he accepted in their name.

The Albert Sauveur Achievement

(*Continued on p. 6*)

Past President R. L. Wilson Congratulates Award Winners at A. S. M. Banquet. Shown, from left: W. T. Ennor (Sauveur Medal); Mr. Wilson; George Sachs (Gold Medal); and H. G. Batcheller (Advancement of Research Award)

Shown at Speakers' Table During the Banquet Are James B. Austin (Left); A.S.M.'s New President, Past President A. H. d'Arcambal (Center), and Newly Elected Vice-President of the Society, George A. Roberts (Right).

Past President Herbert J. French (Left) Seems To Be Concentrating on His Dinner While Past President John Chipman (Right) Chats With H. G. Batcheller (Center), Winner of the Advancement of Research Award at the Banquet

NATIONAL METAL CONGRESS— *(continued)*

Award was presented to W. T. Ennor, assistant director of research, Aluminum Co. of America. The award was established in 1934 in honor of Dr. Albert Sauveur, late Harvard University professor widely known as "Dean of American Metallurgists".

Dr. George Sachs, director of metallurgical research, Institute of Industrial Research, Syracuse University, received the 1953 Gold Medal Award in recognition of his outstanding metallurgical knowledge and exceptional ability in the diagnosis and solution of diversified metallurgical problems.

Brief Notes From Technical Papers

Following are capsule abstracts of various of the papers presented at the technical sessions held by the American Society for Metals. The papers will appear in the Society's "Transactions", and many of them were abstracted in the October issue of *Metal Progress.*

• • •

To determine oxygen content in titanium and zirconium, take a known weight of the metals to be analyzed, and with a known weight of metal or medal oxide containing a given amount of 0^{18} concentration and enough graphite to convert the metal to its carbide, and heat to above the melting point for 1-2 hr., when all the oxygen atoms exchange statistically with the various oxygen-containing compounds, such as the metal oxide, carbon monoxide and carbon dioxide. The ratio of oxygen isotopes in these or any other oxygen-containing compound at equilibrium is identical. Isotopic mass spectrometers can determine the ratio with a high degree of precision. With the ratio known, a simple equation shows the percent of oxygen.—A. D. Kirchenbaum, R. A. Mossman and A. V. Grosse, the Research Institute of Temple University.

• • •

It is possible to measure oxygen and nitrogen contents of molybdenum to within about one part per million by weight by using a new vacuum-fusion apparatus with mercury cutoffs instead of stopcocks and all-glass diffusion pumps and a glass furnace envelope.—M. W. Mallett and C. B. Griffith, Battelle Memorial Institute.

• • •

The most practical method for surface hardening titanium is by ammonia nitriding. Temperature, time and gas composition are three interrelated variables of the process. Nitrogen nitriding is also practical, but requires more time and temperature for comparable results.—James L. Wyatt, of Horizons, Inc., Cleveland, and Nicholas J. Grant, Massachussets Institute of Technology.

The effect of solution treating of titanium alloys varies with alloy composition, solution temperature, cooling rate, and, to some extent rolling temperature. Such treatments produce tensile strengths of 140,000 to 170,000 psi. in sheets, and 140,000 to 195,000 psi. in bar stock, all with good ductility. Age hardening of solution-treated alloys at temperatures up to 700° F. generally results in high strength and low ductility.—W. M. Parris, P. D. Frost and J. H. Jackson, Battelle Memorial Institute.

• • •

Aluminum content of 4% or more does not greatly improve the strength and does markedly reduce the ductility of titanium-aluminum-molybdenum alloys at moderate temperatures. —H. D. Kessler and M. Hansen, Armour Research Foundation.

• • •

In the case of 7 and 11 % molybdenum alloys of titanium, isothermal transformation gives strength-ductility combinations and impact properties generally superior to those obtained by quenching and reheating. High ductilities in titanium-molybdenum alloys are associated with coarse precipitates of alpha uniformly distributed through the grain structure. —D. J. DeLazaro and W. Rostoker, Armour Research Foundation.

• • •

Comparison of transverse mechanical properties of slack-quenched and tempered wrought steel show that the mechanical properties, especially tensile and impact properties, of all steels are alike, independent of composition, over a wide range, provided that they are fully quenched out. But when a steel is slack-quenched, there are considerable variations in those properties, the magnitude of which may depend on the composition of the steel.—John Vajda and Paul E. Busby, Carnegie Institute of Technology.

• • •

For a given metal, an absolute rate of grain growth exists which appears to be dependent upon composition only. Use of this concept can reduce the number of tests required to evaluate recrystallization and grain growth behavior.—F. R. Larson and J. Salmas, Watertown Arsenal Laboratory.

• • •

Although complete elimination of inclusions in commercial forged steels at the present time is impractical and may not be possible at all, yet research on inclusion-free steels indicates that forged steels can be improved by changing the shape and possibly the type of inclusions. For example, spherical inclusions of small size, uniformly dispersed, should not have as deleterious effects on the transverse fatigue properties as do the larger elongated types.—J. T. Ransom, E. I. du Pont de Nemours & Co.

The complete phase diagram of the zirconium-aluminum system is now established.—D. J. McPherson and M. Hansen, Armour Research Foundation.

• • •

The temperature at which molybdenum abruptly changes from a ductile to a brittle behavior can be shifted by changing the microstructure of the metal. An increase of grain size from 1700 grains to 100 grains per sq. mm. raises the ductile-to-brittle transition temperature about 100° C.—J. H. Bechtold, Westinghouse Electric Corp.

• • •

Study of pearlite spacing in steels of four different carbon levels reveals that the 20 ft. lb. and average energy definitions of transition temperatures differ significantly, and, therefore, that care must be taken in choosing a definition of transition temperature.—John A. Rinebolt, Naval Research Laboratory.

• • •

High heating rates, as in rockets, elevates critical temperatures in steels. Quenched and tempered structures result in less elevation of critical temperatures at high heating rates than does an annealed pearlite structure for a given steel. A small tensile stress causes plastic deformation in steel as its temperature is raised or lowered through the critical range.—W. J. Feuerstein and W. K. Smith, Naval Ordnance Test Station.

• • •

The effect of boron in steels is the retardation of the formation of proteutectoid ferrite and bainite. As a general rule, a nucleation and growth process takes place when the system passes from a disordered state to a more highly ordered state. Shear transformation involves cooperative movement from one ordered state to another ordered state. Fundamentally, carbon, nitrogen and boron cause hardenability by the same mechanism. But boron is considerably more effective than the other two.—J. W. Spretnak and Rudolph Speiser, Ohio State University.

• • •

The advantages of boron steels over regular steels are numerous and important enough so that any attempt to restrict their general use on the basis of susceptibility to temper embrittlement would be an injustice. Temper embrittlement may be avoided in any low alloy steel by proper heat treatment.—A. E. Powers and R. G. Carlson, General Electric Co.

• • •

Boron forms an interstitial solid solution in gamma iron, but a substitutional solid solution in alpha iron. —C. C. McBride, E. I. du Pont de Nemours & Co., and J. W. Spretnak and Rudolph Speiser, Ohio State University.

(Continued from preceding page)

The hardenability of a carbonitrided case on plain carbon steel is greater than that of the same steel in the carburized condition. The hardenability of the carbonitrided case on plain carbon steel decreases with decreasing nitrogen absorption. The hardenability of boron steels carbonitrided at 1600° F. is lower than that of the same steels carburized at 1700° F. —G. W. Powell, M. B. Bever and C. F. Floe, Massachusetts Institute of Technology.

• • •

Precision length and magnetic measurements indicate that the presence of silicon in steels necessitates high-tempering temperatures before any third-stage decomposition can be detected. Carbon diffusion controls the kinetics of second and third stages in plain carbon steels. But when the silicon content is sufficient, this control is no longer operative in the third stage because the reaction is being controlled by the diffusion of silicon away from the interface.—Walter S. Owen, University of Liverpool.

• • •

Study of the susceptibility of steels to temper brittleness shows that the carbon-chromium-nickel steel SAE 3312 is very susceptible to embrittlement due to the principle elements and not to impurities. Chromium reenforces the embrittling effect of manganese, as does nickel which reenforces it less. Phosphorus makes nonsusceptible iron-chromium-carbon alloys susceptible to temper embrittlement.—Ralph Hultgren and John Chang, University of California.

• • •

The embrittlement phenomenon which may occur on tempering quenched steels to high strength levels is a precipitation of aging phenomenon.—L. J. Klingler, W. J. Barnett, R. P. Frohmberg and A. R. Troiano, Case Institute of Technology.

• • •

Dendrites in ingots are probably produced by constitutional supercooling and the dendritic equi-axed zone in the center of ingots is the result of nucleation in a large constitutional supercooled region.—W. C. Winegard and B. Chalmers, University of Toronto.

• • •

The susceptibility to intergranular attack of the ferritic steels is not dependent on the presence of austenite as previously supposed, but is attributable to the precipitation of a carbide or nitride phase from ferrite. The susceptibility to intergranular attack of sensitized steels can be removed by a short-time annealing treatment between 1200° and 1500° F. —R. A. Lula, A. J. Lena and G. C. Kiefer, Allegheny Ludlum Steel Corp.

Schedule Seminar on Industrial Standardization

John Gaillard, mechanical engineer, on the staff of the American Standards Association and lecturer at Columbia University, will hold his next 5-day private seminar of 10 conferences on industrial standardization from Jan. 25-29, 1954, in the Engineering Societies Building, 29 West 39 St., New York, N. Y.

The Gaillard Seminars were started in 1947 upon request from companies for assistance in the organization of their standardization work and training of their men in writing standard specifications. More than 120 organizations have been represented so far.

Further details concerning registration may be obtained from John Gaillard, 400 West 118 St., New York 27, N. Y., or through the office of the American Standards Association, 70 East 45 St., New York 18, N. Y.

North Texas Visits Helicopter Plant

Reported by Irving H. Comroe

Consultant, Dallas

The Bell Aircraft Corp., Hurst, Tex., was host to the North Texas Chapter meeting in September. After supper in the plant cafeteria, the group was escorted through the large helicopter plant. Although still under security wraps, Art Settlage, who was in charge of the tour, gave the group several "peeks" into the workings of the plant.

Interest concentrated mainly around the heat treating gear and gage inspection divisions and the new metal bonding and stretch forming processes. More than 50 members toured the plant.

Oregon Visits Chain Plant

Reported by J. E. Gustafso

Bethlehem Pacific Coast Steel Corp.

The first meeting of the Oregon Chapter this season was opened with a social hour and dinner, and after a short business session, the meeting was turned over to John Gray and Ray Carlton, general manager and plant superintendent, respectively, of Oregon Saw Chain, the Chapter's host for an interesting and educational trip through the plant. Mr. Gray gave a short description of plant operations. He stated that Oregon Saw Chain started in 1947 with four employees but now has 173 employed locally with an additional 15 employed at their new plant in Canada across from Niagara Falls, N. Y. They supply 24 of the 28 chain saw manufacturers with original chains and have 2700 dealers and distributors carrying replacement chains throughout the country.

Short Corrosion Course

A four-day series of technical papers and panel discussions is offered by the College of Engineering, and the Extension Division of the University of Oklahoma in cooperation with the Central Oklahoma Section of the National Association of Corrosion Engineers. The course will be directed by John P. Roberts, professor of metallurgy. The papers will be presented at the University, Norman, Okla., from Dec. 1-4.

Speakers and program have been selected with the object of making engineers and operating foremen better acquainted with the practical aspects of corrosion control. Registration fee for the course will be $15; students will be admitted free.

Further information about the course may be obtained from John B. Freeman, Director, Department of Short Courses and Conferences, University of Oklahoma, Norman, Okla.

Offers Photostat Service

The Milwaukee Public Library has offered members of the American Society for Metals prompt photostat service of printed materials in the library. Available at standard, commercial rates are photostats of graphs, charts, schematics, maps, drawings, patents, metallographic illustrations, and newspaper and magazine articles. The service is limited to library materials only.

Photo-copies run approximately 60 cents per page of negative plus 60 cents per positive. Orders for copies of scientific and industrial articles can be made in person or by telephone in the science department of the Central Library, and mail orders are accepted.

To Produce High-Strength Bolts in West Coast Plant

First-time production of high-strength bolts to speed fabrication and erection of structural steel sections for buildings and bridges on the Pacific Coast has been announced by the Bethlehem Pacific Coast Steel Corp. The new product will be produced in the bolt and nut shop at the company's Los Angeles steel mill.

Increasing popularity of the new high-strength bolts among structural steel fabricators and erectors has developed since they are faster and more economical to install than rivets. Field connections in bridges and other steel structures maintain holding tension indefinitely with this type of bolt, which means a substantial saving in maintenance costs. Used in place of field-driven rivets, high-strength bolts can be installed by a crew of two men, one to operate an impact wrench, the other a holding wrench. Installation of these fasteners minimizes the disturbing noise of the rivet gun.

Gives Safety Factors in Heat Treating

G. G. Leitch (Center), Fellows Gear Shaper Co., Spoke on "Industrial Heat Treating" Before the Boston Chapter Recently. Shown are, from left: E. D. Bach, technical chairman, Mr. Leitch, and Sidney Baylor, chairman

Reported by R. A. Pomfret
Bethlehem Steel Co.
Shipbuilding Div.

George Leitch, Fellows Gear Shaper Co., spoke on "Industrial Heat Treating" at the Boston Chapter's meeting in October.

The importance of control of established heat treating procedures was brought out by the speaker. In production heat treating, where the desired heating, quenching and tempering cycles are known, the maintenance of equipment to produce these cycles is of extreme importance. Maintenance, rather than repair, was emphasized, and illustrations were given to show the value of a maintenance check-off chart for items requiring daily, weekly or monthly attention.

Of particular interest is the maintenance of contactor points in salt bath and furnace controls and on cranes. Mr. Leitch has found that special alloy points will last longer than copper, but that all will ultimately fail and cause the equipment to become inoperative. His solution to this problem is to revert to the use of copper points, and to remove them weekly for polishing, thus preventing the development of pitting.

Gas carburizing is controlled accurately by means of extensive test log records. Test logs made with different proportions of gas and different heating cycles are examined for carbon level and gradient, and this information is recorded for future use. As a means of gas-leak detection on carburizing furnaces, manometers are used.

Quenching is also closely controlled and oil tanks are equipped with variable-speed circulating pumps, oil heaters and coolers. Quenching salts must be checked frequently to prevent build-up of barium salts, which raise the melting point. Frequent chemical checks are made for barium and the bath is adjusted as necessary by the addition of sodium and potassium salts, thus avoiding undesired freeze-ups.

In tempering, double instrument protection is used to prevent difficulties arising from over-riding temperatures. Control instruments are given frequent attention by specially trained maintenance personnel.

Safety has assumed increasing importance in plant operations, and the heat treating department is no exception. Mr. Leitch pointed out how study of insurance company reports of accidents had enabled him to avoid the occurrence of similar casualties in his own operations.

Tells of Advancements In Tin Plating and Tin-Containing Alloys

Reported by Lewis H. Gross

"Trends and Developments in Tinplate, Tin Alloy Electrocoatings and New Tin Containing Engineering Alloys" by Robert J. Nekervis, supervisor, metallurgical research and development, Tin Research Institute, Inc., was the topic of the September meeting of the Baltimore Chapter.

In discussing trends and developments in tinplate, Mr. Nekervis showed the trend towards further tin conservation to be of major importance. He referred to the excellent position of tin from the standpoints of production, reserves and stocks, and stated that there are adequate substitutes for tin for most major end uses, but that these are less economical. Reasons were advanced for tin being higher priced than the other common metals.

The trend toward lower weights of tin coating on tinplate over the past 11 years has been accompanied by a precipitous increase in the amount of inside can lacquers used. The present status of tinplate industries and can manufacturing industries were covered. At present, they are on the threshold of a change from relatively heavy coated hot-dip tinplate to lighter "differentially" coated electrotinplate for the relatively corrosive foods which account for 30% of tinplate used in this country. To achieve this it was shown that there must be a marked improvement in the steel base. This goal has not yet been reached on an industry-wide basis. The various processing factors which affect the corrosion of tinplate in cans was covered, and a new test to measure the solderability properties of tinplate described.

New developments in the technology of tinplate and canning which have been announced within the past year were described. Asceptic canning, particularly of fresh and concentrated fresh milk, and bright as-deposited electrotinplated strip were among these.

Bright tin-nickel, bright tin-copper, tin-zinc, tin-cadmium, tin-lead, and copper-tin-lead were also discussed and their outstanding properties summarized.

Newly developed aluminum - tin bearing alloys containing up to 30% tin appear to offer a combination of the conformability and antifriction properties of tin babbitt with many times its strength.

A new weldable high-strength titanium alloy containing tin, in which the tin constituent was responsible for the good welding properties of this alloy, was also discussed.

Announce Bibliography On Electron Microscopy

To keep abreast of world literature in all fields of electron microscopy, the New York Society of Electron Microscopists has started to issue a bibliography on Keysort cards. The first issue covering the years 1950, 1951 and 1952 is now available at $12.50 to individual buyers, and $25 to institutions.

Early publication of material for 1953 and quarterly publications on current literature thereafter are planned. Annual subscription will be based on the calendar year at the rate of $10 and $20 to individuals and institutions respectively. A special offer effective until Dec. 31, 1953, permits subscribers to receive the 1950-51 and 1952 references already available, plus those for 1953, soon to be published, *plus* the 1954 quarterly issues, for $20 and $40 to individuals and institutions respectively. Those taking advantage of this offer will continue to receive any supplementary references that may have been missed for any of the above mentioned years.

Orders with remittance should be sent to the New York Society of Electron Microscopists, 2 East 63rd St., New York 21, N. Y. UNESCO coupons used for foreign orders will be recognized.

Discusses Metal "Hot-Rods"

Reported by Trevor F. Heard

Salesman
Canada Metal Co., Ltd.

Tiny bits of metal, jolted by the atom to the point where they are more radioactive than all the refined radium in Canada, are at work in heavy industry, according to Peter J. Stewart, speaker, who addressed the joint meeting of the Western Ontario Chapter A.S.M. and the District Chapter of the Canadian Welding Society in October. Dr. Stewart figured in atomic developments in Canada and England, leaving the Chalk River project in 1950 to become one of the first four members to found Isotope Products, Ltd. He is supervisor of inspection services in the company.

Dr. Stewart's talk dealt with a variety of new radiographic techniques using artificial isotopes. He discussed the use of radioactive iridium and described the handling of iridium of up to 200 curies.

The isotope had proven particularly useful in weld inspection. He described radiographic examination of welds in Horton spheres, oil storage tanks, pipelines, submarines and other forms of construction.

Describes Methods of Gas Cleaning in Blast Furnaces

Reported by J. B. McNichol

Metallurgist, Algoma Steel Corp.

The Northern Ontario Chapter heard G. Paul Burks, who, until his retirement in 1952, was divisional superintendent of the blast furnace department at U. S. Steel Corp.'s Gary (Ind.) works. He spoke on "Gas Cleaning in the Blast Furnace".

Ever since top gases from the blast furnace have been utilized for their heat value, it has been found necessary to separate the furnace flue dust from the gases. Blast furnace gas is used as a fuel in steel plants for gas engines, gas boilers, coke ovens and reheating furnaces. If this gas, going, for example, to the coke ovens, is impure, dust in the gas is deposited in the regenerators, producing an inefficient operation and an inferior grade of coke. Contamination of the rivers and the air by this flue dust is a major problem in large cities such as Pittsburgh and Philadelphia where large numbers of the furnaces are in operation.

This gas is cleaned by being passed first through a primary dust catcher which is a large bricked cylinder in which the direction of gas flow is abruptly changed—catching the dust in the bottom of the cylinder. Gas leaving the furnace top has from 7 to 30 grains of dust per cu. ft. After leaving the dust catcher it contains from 3 to 10 grains.

Primary cleaning is done in gas washing towers in which the ascending gas is washed by water sprays. This reduces the dust to approximately .06 to 1 grains per cu. ft.

Final cleaning is accomplished by a variety of methods. Mr. Burks described electrostatic precipitators and Thiessen washers. The precipitators impart an electric charge to the dust particles. The particles adhere to tubes or plates and are washed off. After this cleaning the gas contains .0008 to .005 grains per cu. ft. and is pure enough for heating purposes.

Mr. Burks described the gas cleaning facilities at the Gary plant of U. S. Steel. Problems involved in the successful operation of the washers and precipitators were also discussed. Mr. Burks illustrated his talk with lantern slides which showed the composition of the various cleaning mechanisms, plus a number of tables on their efficiency.

Types of Carbonitriding Explained

Carl F. Floe, Massachusetts Institute of Technology, Talked on "Carbonitriding" at the Annual Steel Treaters Night in Chicago. Shown are, from left: William G. Zaruba, Armour and Co., technical chairman; Dr. Floe; J. Kubik, Stewart Warner Corp.; and Otto Zmeskal, chairman

Reported by Paul Gordon

Institute for the Study of Metals
University of Chicago

Carl F. Floe of Massachusetts Institute of Technology gave the Chicago Chapter an authoritative survey and discussion of "Carbonitriding" at the annual "Steel Treater's Night" in September. The talk was followed by a lively discussion period evidencing the great interest shown in this comparatively new process.

Carbonitriding, according to Dr. Floe, is a process similar in its results to cyaniding and liquid carburizing. It consists essentially of the absorption of both carbon and nitrogen from a mixture of gases passed over the steel at temperatures above the critical range for steel, followed by cooling at the proper rate for hardening. Two types are produced:

At temperatures between 1200 and 1400° F., a very thin case made up of two layers is produced. The outer layer consists of iron-carbon-nitrogen compounds, the inner layer of austenite decomposition products. This type of treatment is generally not followed by hardening, so that the case properties are derived chiefly from the compound layer. The case is of relatively low hardness, but has good wear resistance under some conditions and also has the important advantage of very low distortion.

At temperatures between 1500 and 1650° F., a much thicker case is produced. Here the compound layer is generally absent, and the case, which consists of the decomposition product of iron-carbon-nitrogen austenite, is hardened by oil quenching. This type of treatment is by far the more important, and produces a case comparable in properties to a carburized case with the added advantages of higher hardenability and greater resistance to tempering due to nitrogen absorbed with carbon.

Dr. Floe pointed out that a large variety of time-temperature gas mixture combinations are in use commercially because of differences in equipment, sizes and shapes, but, in spite of this, consistently good results are obtained without inordinate difficulty. Typical carbonitriding conditions are: 1 to 3 hr. at 1550-1650° F. with a gas mixture consisting of 3-20% NH3, 3-20% natural gas, plus an inert carrier gas.

The process is being used successfully on gears, bushings, washers, spacers, push rods, unts, mill wire products and cast iron parts.

Factors in Design to Prevent Corrosion Cited by Mears

Reported by H. M. Braid

Sales Engineer
Minneapolis-Honeywell Regulator Co.

R. B. Mears, manager, research and development laboratory, U. S. Steel Corp., spoke on "Designing to Prevent Corrosion" at the October meeting of the Ontario Chapter.

When a new factory, a new structure or a new piece of equipment is being designed, the engineer should take into consideration many details. In selecting the location for a factory, availability of transportation, labor, water supply and the contour and nature of the proposed site are given careful consideration, but the relative corrosiveness of the proposed location is frequently not considered. Yet, thousands of dollars may be saved during the life of the factory if the location selected is less corrosive than other locations.

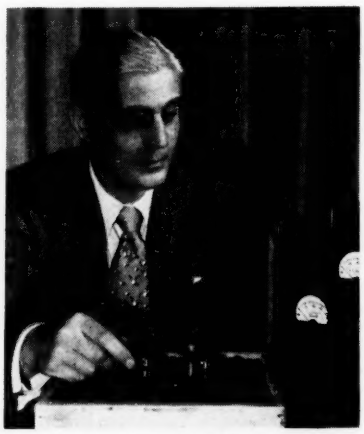
Similarly, in designing structures or equipment, if pre-thought is given to preventing corrosion, substantial savings in maintenance costs during their periods of service can generally be obtained.

Interestingly enough, when designing to prevent corrosion, initial costs may not be appreciably different from those required when resistance to corrosion is not considered.

The time to consider possible ravages from corrosion is at the design stage. Improper design may make maintenance difficult or impossible—proper design may be more important than material selection.

When designing any type of fabricated unit that will be exposed in service to outdoor atmospheres, waters, soils or chemicals, corrosion resistance should be of primary importance. Crevices, moisture traps and pockets, and parts made of dissimilar metals should be avoided. If the latter is impossible, appropriate protective measures should be employed to eliminate galvanic corrosion. Ease of maintenance should also be considered during the initial design.

A little attention to prevention of corrosion at the design stage will result in real rewards during subsequent service life.



R. B. Mears

Metal Refineries Merge

R. Lavin & Sons, Inc., Chicago, has recently completed arrangements for the absorption of L. A. Cohn & Bro., Inc., of Chicago. The merger brings together two of the largest, oldest and best-known nonferrous metal smelters and refiners in the United States. R. Lavin and Sons, Inc., purchased all of the inventory and physical effects in the Cohn plant, and Max S. Cohn and Marvin M. Cohn will hereafter be associated with R. Lavin & Sons, Inc.

The acquisition of Cohn & Bro. will enable Lavin & Sons to more completely serve all customers in both the secondary and prime nonferrous metal industry. The new organization will serve consumers of brass ingot, aluminum, copper anodes, babbitt, zinc die castings, and all deoxidizing grades and fluxes pertaining to white and red metals. It will continue to operate its expanded Chicago and North Chicago plants, and is presently negotiating for a plant in the East. Officers are: William Lavin, president, Morris Isaacson and Norman Lavin, vice-presidents, and Benjamin Lavin, who is secretary-treasurer.

Company to Enlarge Lab

An expanded research program has been planned by E. F. Houghton & Co., Philadelphia. Additional floor will be added to the present research laboratory to provide required facilities for the program and the staff of chemists will be increased. The expansion is intended to open a new approach to the project of cutting fluids for modern machine tools, to further the study of chemical surface treatment of metals, to expand the heat treating program, and to add emphasis to the study of textile oils and synthetic processing agents for the many new man-made fibers now being perfected. Construction is expected to start late this year.

Appoints Sales Engineers

Appointment of Industrial Product Sales, Inc., as field sales engineers for the states of Ohio and Michigan has been announced by the Alloy Precision Castings Co., Cleveland. Company headquarters are in Akron, Ohio, with branch offices in Dayton, Ohio, and Detroit.

Industrial Products Sales handles castings, forgings, stampings, fasteners, and welded steel tubing.

Outlines Progress in Forging Industry for Rocky Mt. Chapters

Reported by Eugene Jiannetti

Dow Chemical Co.

Both the Denver and Pueblo sections of the Rocky Mountain Chapter heard Victor Brown, vice-president and technical director of Kropp Forge Co., speak on "Practices and Trends in the Forging Industry" during September.

Mr. Brown discussed the early beginning of forging practice and showed its progress to the present day. Up to the time of World War I, a hammer man was an artist who shaped an ax blade or plow shear to the proper size and shape strictly by eye. However, with the advent of war, the need for mass-produced forgings became great. In order to meet this demand impression dies were developed, thereby greatly reducing the amount of time necessary to forge a part to the desired shape. Had it not been for the automobile, the forging industry probably would have suffered a setback at the end of the war, but the need for such mass-produced items as connecting rods, crankshafts and gears for the automobile made it possible for this industry to develop and grow. Even greater impetus was given to the forging industry when the aircraft industry started to use forged parts.

The latest undertaking has been forging parts for jet engines. This has probably been the greatest challenge the industry has met. It has been necessary to forge high-strength materials which previously had been considered too difficult. Furthermore, the part has to be forged practically to the finished size to minimize machining.

He also discussed die problems arising from forging parts for jet engines.

New Jersey Chapter Presenting Course on Heat Treating Metals

An educational lecture course on the "Theory and Practice of Heat Treating" is being given by the New Jersey Chapter. The program, which commenced on Sept. 28, is being conducted by Norman E. Woldman, consulting engineer, and editor and publisher of *Alloy Digest*, as a complete educational course along practical lines. Each lecture is supplemented with a discussion period, and each of the registrants is being presented with a copy of the A.S.M. book "Heat Treatment of Metals".

The five lectures will be on: **General Purpose of Heat Treating; Principles and Theories of Hardening; Factors Affecting Hardenability; Surface Hardening; and Troubles in Commercial Heat Treating.**

WHAT THE SCIENCE TEACHERS ARE DOING

When the A.S.M. established the offering of the Science Achievement Awards for Students, a program was also initiated to recognize the work being done by the teacher in encouraging and guiding their young students. Accordingly, the committee in charge of the program set aside $1000 to be awarded to science teachers for essays or reports on their most effective ways of working with students, individually or in small groups, or in such other ways as they choose to discuss or to illustrate.

The judging committee for the 1953 essays have selected 18 essays to receive $50 awards and ten other entries for Honorable Mention. Following are listed the names of the teachers selected for the awards and honorable mention, together with their schools and teaching positions, titles of their entries, and a brief statement describing the nature of the entry.

Name	Teaches	School	Type of Award*	Entry	Nature of Entry
Thomas L. Bagshaw	General Science	East Jr. High School, Watertown, Mass.	HM	Results of Study for Reorganization of General Science Course of Study	Proposes reorganization on study of science interests and preferences of pupils in Watertown junior high schools. Proposes extension of present program to include 7th-grade work, and has worked out units for all three junior-high school levels.
Maurice Bleifeld	Biology	Newton High School, Elmhurst, N. Y.	A	Planting an Interest in Science Among Honor Class Pupils	Feels bright students do not arrive in high school with any special interest in science. Having identified and regrouped these honor students, program is initiated aimed at starting operations at success level through group activity, leading through projects into individual work.
Mrs. Phyllis B. Busch	Biological Sciences	Abraham Lincoln High School, Brooklyn, N. Y.	A	A Guided Trip to the Hall of Conservation, American Museum of Natural History	(Group report with Ira Shein and Sam Katz.) As a device to aid in teaching conservation of natural resources a series of "trails" or guides to tours of exhibits in Felix M. Warburg Memorial Hall on Conservation is presented as a planned program for three different teaching levels.
Mrs. Miguel A. Caballero	Head of Science Dept.	Red Bank High School, Chattanooga, Tenn.	A	Utilizing Community Resources in Teaching Science	As an integral part of a whole six-year science program, most is made of affiliations with national groups and local sources of backing and cooperation.
Myrtle E. Creaser	Science	Washington Jr. High School, Kenosha, Wis.	HM	Health Teaching	Practical suggestions described and visual aids pictured to help ninth-grade teacher with work in health.
Mrs. Catherine W. Dale	General Science	Calumet Township High School, Gary, Ind.	HM	Encouragement of Science-Talented Young People	Writer "sold" science projects and science fair to pupils through active science club which attracted more than one-third of the junior-high school enrollment. Number of students who had no educational intentions beyond high school were encouraged to prepare for college and seek parental support for their new ambitions.
Herbert Drapkin	Biology and General Science	William Cullen Bryant High School, Long Island City, N. Y.	A	Enriching Science for Youngsters	Extracurricular program affording opportunity for individual science experimentation at the elementary-school level, as offered at the Queens Youth Center, Queens College, N. Y.

Name	Teaches	School	Award* Type of	Entry	Nature of Entry
Mrs. Ruth Essig	Instructor, University Extension	University of California, Los Angeles, Calif.	A	Coffee Can Kit	Series of experiments with magnets and batteries is outlined in a manual supplied with a simple kit, assembled by the author, that fits into a coffee can. Mrs. Essig hopes to commercialize the kit.
Philip Goldstein	Biology	Abraham Lincoln High School, Brooklyn, N. Y.	A	I'll Never Do It Again	Author feels that science talent grows out of science interest, development of which is synonymous with discovery of science talent. Working with honors class, he demonstrated that science talent could be developed, but appears to have found it an exhausting task.
Wallace M. Good	Science, Physical Geography and Physiology	Wyandotte High School, Kansas City, Kans.	A	Report of Wyandotte High School Science Field Club	High-school science field club used as teaching tool designed to provide essential experiences for boys contemplating professional fields of science. Club aids in early identification of students with scientific interest and potential.
Elizabeth Gray	Biology	Forest Hills High School, Forest Hills, N. Y.	A	A Bio-Arts Club	Making biological models, using various techniques, stimulates interest in science through creative work, and furnishes the school with valuable models, some of them unobtainable elsewhere.
Edwin P. Heinrich	Physics, Senior Math and Science	Sidwell Friends School, Washington, D. C.	A	The Actinoscope, a Device to Demonstrate the Presence of Ionizing Radiation	Author designed and constructed simple, inexpensive instrument for use in secondary-school science classes for demonstrating existence of invisible electro-magnetic radiation.
Dr. Vivla V. Johnson	General Science	Norman Jr. High School, Norman, Okla.	HM	How To Individualize Instruction in Large Classes	Procedures for individualizing instruction described in detail: use of work-books, outside conferences, projects, student presentations, science club, science fairs and "nights", and examinations. Practical "How to Study" hints.
Flora Kahme	7-8th Grade	Port Jefferson Elementary School, Port Jefferson, Long Island, N. Y.	A	Port Jefferson Elementary Science Exhibit	Organization of science fair at elementary-school level described; its contributions to school's program evaluated by teaching staff.
Enid A. Larson	General Science and Biology	Carmel High School, Carmel, Calif.	A	A Living Laboratory. Carmel High School's Natural Area	An unused plot of land was set aside for use by the Biology dept. in a study program with far-reaching effects involving many subjects and skills beyond the immediate field of biology.
Robert B. Leitch	Science and Social Studies	Lincoln Jr. High School, Santa Monica, Calif.	A	Integration and Visualization of Science and Geography	Faced with the necessity of shortening a 7th-grade course in science from a year to a semester to make room for a semester of geography of the eastern hemisphere, the author successfully combined subjects on the basis that every geographical concept has scientific explanation and every scientific principle has a direct or indirect application to geography.
Milton S. Lesser	Biology	Thomas Jefferson High School, Brooklyn, N. Y.	A	Providing for Teaching of Some of the Elements of the Scientific Method	Classroom experiment on digestion of starch to sugar by siliva in the mouth used to demonstrate scientific method of problem solving. Author insists pupils consider numerous possibilities and exercise many cautions before drawing conclusions.

Name	Teaches	School	Type of Award*	Entry	Nature of Entry
Mrs. Eloisa P. Lopez	4th and 8th Grade	Colego del Espiritu Santo, Hato Rey, Puerto Rico	HM	Techniques for Bridging the Gap in Science Between the Elementary and Junior High School	Teacher with 43 years of experience gives suggestions for teaching elementary science through familiar experiences with due emphasis on social and economic aspects of science.
Robert D. MacCurdy	Biology	Senior High School, Watertown, Mass.	HM	Some Practices and Ideas for Use in Science Education	Papers published in educational journals compiled in report. Titles include—Modern Marks with Meaning, Going Fishing—for Scientists and Engineers, Is Our Survival Potential Dependent on Improved Science Education, and the Science Fair Is Easy if You Let the Students Do It.
Mrs. L. G. Mason	Science and Math	Lexington Jr. High School, Lexington, Ky.	A	Tree Study	Complete study unit for the 8th grade, including original and simple key for identifying trees by their leaves.
Mrs. H. L. Merrill	English, Trigonometry, Physical Science	Duncan U. Fletcher High School, Jacksonville Beach, Fla.	HM	An Electve Course in Physical Science	A 9-unit course predicted on 12 philosophical and educational concepts. Suggestions for classroom procedure.
Clifford R. Nelson	Science	Weeks Jr. High School, Newton Center, Mass.	HM	About Me	Personal approach to study of heredity.
James A. Parker	Related Physics	Armstrong Technical High School, Washington, D. C.	A	Partial Outline for a Course of Study in Related Physics	Operations of machine shop related to scientific principles of physics.
Steven M. Pattee	Biology	Roosevelt High School, Cedar Rapids, Iowa	A	Let's Learn About the Rodents of Eastern Iowa	(With Misses Lorene Harrington and Betty Terril and Chester Mau.) Biology Club publishes series of natural history booklets of which entry is a sample. Work involves departments of art, English and printing and outside sources of assistance. Booklets are in demand by teachers of other natural sciences.
Weldon E. Polzin	Science	San Marcos Jr. High School, San Marcos, Texas	HM	Science and Student Interest	Basic assumptions about science teaching and specific suggestions. General objectives of program. Student interest demonstrated through series of photographs showing demonstrations, field trips, classroom activity, science fair and science assemblies.
Herbert H. Reichard	Physics	Allentown High School, Allentown, Pa.	A	The Seventh Annual Lehigh Valley Science Fair	Entry is complete scrapbook, offering a warm and comprehensive picture of activity covering an area of eight counties.
Alexander Taffel	Science	James Monroe High School, The Bronx, N. Y.	HM	Experiences in Science for Homework	Author assigns first-hand experiences for homework, and has interested other teachers in this type assignment, at time report was written, direct-experience homework had been tried in general science, biology, chemistry, and physics departments of the author's school.
Harold D. Yoder	Biology	Altoona Sr. High School, Altoona ,Pa.	A	An Elementary Microbiology Course for Senior High School Students	Course in general bacteriology outlined for the better general student and for pupils who plan to enter nursing, pharmacy, medicine or related professions.

* A—Award
HM—Honorable Mention

Winners in A. S. M. Metallographic Exhibit

National Metal Exposition, Cleveland, Oct. 19-23, 1953

Best in Show
Grand Prize of $100
B. C. Leslie and R. J. Gray
Oak Ridge National Laboratories
Oak Ridge, Tenn.
"Aluminum-Uranium Alloy as Cast."
Electropolished and anodized, photographed with sensitive tint.

Toolsteels and Tool Alloys

Best in Class: Michael J. Antus and Birger L. Johnson, Latrobe Steel Co., Latrobe, Pa.—"High Speed Steel —Distribution of Carbides, Heat Treated Structure, Surface Condition and Austenitic Grain Size."

Honorable Mention: Bengt Soderlund, Sandvik Steel Works, Sandviken, Sweden—"Fatigue Fracture in 11-In. Roll for Cold Rolling Mill."

Stainless and Heat Resisting Steels

Best in Class: C. Feng, P. Lillys and F. Baureis, Crucible Steel Co. of America, Harrison, N. J.—"Selective Staining of Austenite, Martensite and Ferrite in a 21% Cr Steel."

Steel and Cast Iron

Best in Class: Takeomi Okumoto and Hidestugu Tsuchikura, Japan Institute of Metals—"Graphite Nodule in Spheroidal Graphite Cast Iron."

Honorable Mention: Hildreth Griffin Florant, Metallurgist (on leave), Sperry Gyroscope Co., Great Neck, L. I., N. Y.—"Crystallographic Etching of a Ni-Fe Alloy to Show Structure and Substructure."

Nonferrous Metals

Best in Class: Francis Cain, Jr., Metallographer, Westinghouse Atomic Power Div., Homestead, Pa.—"Interface Area Between Zirconium and Uranium Alloy."

Honorable Mention: Matthew J. Donachie, Jr., Rensselaer Polytechnic Institute, Troy, N. Y. — "Structural Development by Heat Treatments."

Honorable Mention: H. P. Roth, Massachusetts Institute of Technology, Cambridge, Mass.—"Zirconium —Rotation of Same Area in Polarized Light."

Welds

Best in Class: Oliver E. Olsen, National Lead Co. Research Laboratories, Brooklyn. N. Y.—"Soft Soldered Automotive Tubular Radiator Joint."

Surface Phenomena

Best in Class: Francis Cain, Jr., Westinghouse Atomic Power Div., Homestead, Pa.—"Grain Boundary Migration in Arc Melted Hafnium."

Honorable Mention: E. E. Hoffman and T. K. Roche. Oak Ridge National Laboratories, Oak Ridge, Tenn.—"Fe-Ni-Cr Crystals Deposited on a 316 Stainless Steel Specimen."

Results by Unconventional Techniques

Best in Class: P. A. Jacquet, J. Poulignier, Ch. Buckle and A. Lehon, Office National d'Etudes et de Recherches Aeronautiques, Paris—"Metallographic Determination of Temperatures Occurring in Service on Parts of Thermal Engine."

Honorable Mention: R. B. Belser, L. A. Woodward and J. L. Brown, Georgia Institute of Technology, Atlanta, Ga.—"Interface Between Indium and Evaporated Gold Film."

Honorable Mention: Elmars Ence, New York University, New York City—"Titanium Alloys Using Electrolytic Stain Etch."

Slags, Oxides and Inclusions

Best in Class: Francis Cain, Jr., Westinghouse Atomic Power Div., Homestead, Pa.—"Inclusions in Uranium."

Honorable Mention: Nobuji Sasaki, Ryuzo Ueda and Kenji Mori, Japan Institute of Metals—"Reduction of Molybdenum Oxide Crystals."

Series Showing Transitions or Changes During Processing

Best in Class: B. C. Leslie and R. J. Gray, Oak Ridge National Laboratories, Oak Ridge, Tenn.—"Aluminum-Uranium Alloy, As Cast, Cold Worked and Recrystallized (Photographed with Sensitive Tint)."

Honorable Mention: Anne R. Kendra, E. M. Grala and W. A. Maxwell, Lewis Flight Propulsion Laboratory, N.A.C.A., Cleveland—"Nickel-Aluminum Alloy Showing Homogenization of Cast Structures."

P. M. I. Adds Department

A technical and engineering department has been established by the Pressed Metal Institute, Cleveland. Headed by a full-time technical director, the department will serve metal stamping manufacturers by studying technical trends, advising of technical advances in competing industries, publishing a handbook and monthly bulletins, and cooperating with engineering colleges. Research programs are also to be scheduled.

Finds New Use for Stainless Steel

The Above Mural, Said to be the First Stainless Steel Mural to be Installed Outdoors, Was Recently Unveiled at the Sorg Paper Co., Middletown, Ohio. It measures 9 x 18 ft. and marks the 100th anniversary of the company. The artist, Buell Mullen, is widely known for her highly original, symbolic murals on stainless steel. The Sorg mural is entitled "Paper Records History and Progress" and is done in colors on Armco stainless steel, as also are the frame, handrail and plaque

Speaks on Physical Metallurgy in the Aircraft Industry

Reported by H. M. Braid
Sales Engineer
Minneapolis-Honeywell Regulator Co.

R. Smallman-Tew, chief metallurgist, aircraft division, A. V. Roe Canada Ltd., spoke on "Physical Metallurgy in the Aircraft Industry" at the initial meeting in Ontario.

In discussing developments that have taken place recently and which have led to radical improvements in the performance of aircraft, the speaker limited himself to the study of airframes and pointed out that, although a similar story could be told on the engine side, there was not time to deal with both sides of the subject.

As stronger and lighter metals are made available to the aircraft designer, he takes advantage of them by designing aircraft capable of flying faster and for greater distances. When he reaches the limits of the metals available, he turns to industry with a request for still stronger and still lighter materials with which to build the actual airframe.

Titanium, the high-strength magnesium alloys, and the high-tensile steel castings currently being developed were discussed briefly. Problems which occur with even well-known metals were mentioned. The speaker pointed out that, although industry has had considerable experience with these materials, difficulties of a quite unexpected nature do crop up and have to be tackled promptly by the physical metallurgist to avoid serious holdups in production. Residual stresses in high-tensile aluminum alloys which cause distortion in machining, a peculiar form of porosity and cracking sometimes encountered in welding, and a brittle condition that has been encountered in high-tensile steel were cited as examples of some of the difficulties. These become significant only when materials are used—as in aircraft construction—at high-stress levels as any reduction in the strength properties which have been set for the design case cannot be tolerated.

In his concluding remarks, the speaker discussed the qualifications and experience needed by a successful physical metallurgist in the aircraft industry. In view of the fact that present-day aircraft involve a number of basic metals and a much larger number of alloys, those handling them must have a wide knowledge of physical metallurgy if they are to be successful in this work and are to make really worth-while contributions to the field of aircraft design and construction.

New Jersey Hears Austin And Report on Course for High-School Instructors

Reported by John L. Everhart
Materials & Methods

"Magnification in Time" was the talk given by J. B. Austin, A.S.M. President-Elect at the National Officers Night meeting in New Jersey. Dr. Austin discussed the use of high-speed photography in the study of metallurgical laboratory and plant operations, and illustrated his talk with slides and films taken at speeds of 3000 frames per second.

In the absence of National Secretary W. H. Eisenman, who was installing a new chapter, Dr. Austin also presented the regular report on A.S.M. activities.

Following Dr. Austin's remarks, William C. Schulte, Curtiss Wright Corp., and past chairman of the New Jersey Chapter, gave a brief report, illustrated by his own colored slides, of the educational course held at the Oswego (N.Y.) State Teachers College last June.

This course, sponsored jointly by A.S.M. and the New York State Department of Education, was attended by 24 high-school teachers. The report was particularly interesting to the New Jersey Chapter since the course was a revision and expansion of a similar course given by the Chapter at Bayonne, in 1943-44. These courses were designed to demonstrate to technical and vocational high-school teachers methods which could be used to teach their students about the behavior of metals.

A. Bornemann, New Jersey Chapter, gave a series of five talks on "Metals Technology" and J. Umowski, New Jersey Chapter, supervised a group of laboratory exercises which had been devised to assist in teaching metals technology. A series of talks on "Iron and Steel" was presented by Prof. Williams of Massachusetts Institute of Technology.

Future Scientist Is Inland Empire Guest

Robert E. Dycus (Center), 16-Year Old, 10th Grade Student at Lewis and Clark High School, Spokane, Wash., a Winner in the National Science Achievement Awards Project Sponsored by A.S.M. for the Future Scientists of America, Is Shown With His Father (Right), and Stanley Fergin (Left), at the September Meeting of the Inland Empire Chapter. Robert's project was "Ecliptic System of the Celestial Sphere". H. M. Louderback, chemistry teacher at Lewis and Clark High School, has accepted chairmanship of District 8 for the Future Scientists of America Contest for 1954

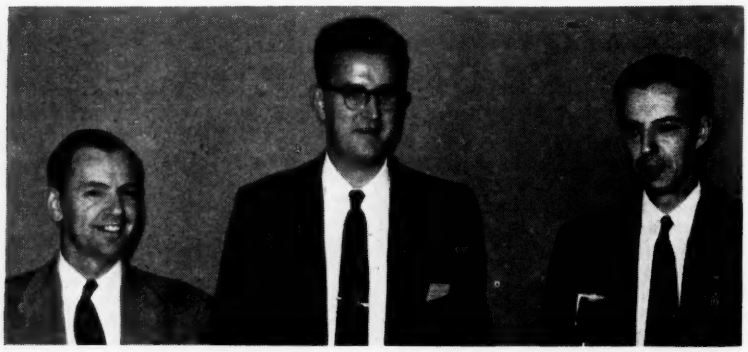
Reported by Helen Goerig
Kaiser Aluminum & Chemical Corp.

Amon L. Groves, manager of Western Light Metals, opened the Inland Empire Chapter's season by describing the operation of an aluminum foundry and showing the Naval research movie "Gating Systems for Metal Casting". A tour of the Western Light Metals foundry followed. The plant is modernly equipped for making cores and sand molds for the casting of aluminum parts up to 60 lb. in weight, most of which are made for the trailer industry.

The Chapter also honored a student from Lewis and Clark High School who had won an achievement award in the 1953 contest conducted by "Future Scientists of America".

F. R. Morral reported on future educational activities to be sponsored by the Chapter. Highlighting coming events will be the 1954 Inland Empire Science Fair, and judging of the Future Scientists of America contest for District 8 in 1954.

Talks on Machinability at West Michigan



F. E. Dreves (Center), Metallurgical Engineer for the Two Eastern Plants of the Wyckoff Steel Co., Spoke on "Machinability" Before the First Meeting of the West Michigan Chapter. He is shown with J. J. Kenny, Jr., (left), program chairman, and J. D. Fitzpatrick (right), chapter chairman

Reported by W. B. Rice

Supervisor of Laboratories
Norge Div.—Borg-Warner Corp.

The West Michigan Chapter heard F. E. Dreves talk on "Machinability" at its first meeting. He is metallurgical engineer for the two eastern plants of the Wyckoff Steel Co.

Mr. Dreves emphasized the role of the steel mill in supplying cold finished bars for improved machinability. The cold drawing operation and its effect on machinability and mechanical properties, and the response of Bessemer, carbon and alloy steels in these respects were discussed.

While bars in the soft and brittle condition represent the optimum for ease of machining, the condition often ranges from soft and tough to hard and brittle. The speaker discussed the effects of microstructure on the machinability of steel bars. He showed that the metallographic constituents, ferrite, inclusions and iron carbide, have an important bearing on machinability. This is evidenced by the trend toward specification of required microstructure rather than required hardness by many manufacturers.

A banded structure, which results from insufficient hot rolling to break up the dendritic structure, gives erratic results in machining. Manganese sulphide inclusions help break up the chips and provide a certain amount of lubrication for the cutting tool. The shape, distribution and amount of iron carbide have a profound influence on the machinability of steel bars.

The reasons for and effects of stress relieving and annealing of cold drawn bars were given. Mr. Dreves closed by stating that the best results can be achieved when the cold finishing mill knows the problems confronting individual production.

Personnel Relations In Industry Topic at Utah Chapter Meeting

Reported by Don Rosenblatt

Chief Metallurgist
Eimco Corp.

Robert N. McGee, special sales representative of the Jones & Laughlin Steel Co., spoke on "Personnel Relations" at a meeting of the Utah Chapter in September. Mr. McGee emphasized the obligation of modern-day management in "matching words with deeds". The lingering resentments of employee groups against the exploiting, ruthless management of the distant past are gradually being dispelled by demonstration of present-day management's sincerity in matters of employee safety, wages and other benefits.

Mr. McGee stressed his optimism by pointing out that a misconception of *mass effort* is prevalent in the ranks of the layman. He strongly feels that the identity of the mass ultimately resides in the individuals from which it is comprised, and that individual values and morality then must eventually insure that the mass efforts of labor will become a boon to American economic and social progress.

Mr. McGee pointed out that union leadership is now showing the derived benefits of administrative education. As union leadership becomes better versed in acceptable business procedures it must in turn go to the bargaining table having more in common with management and, therefore, a better understanding of the problems of management. On the other hand, when management takes a sincere interest in such matters as plant safety or employee's benefits it must go to the bargaining table with a more thorough understanding of the motivations of the individuals comprising a labor mass. Mr. McGee believes the effect of such mutual narrowing of differences certainly must hold promise of improving personnel relations.

Mr. McGee's energetic delivery and humorous interjections managed to keep the somewhat technically minded audience highly receptive to his philosophical dissertation concerning the complex problems of personnel relations.

Narrates Gating Design Movie at Kansas City

Reported by Robert D. Scrom, Jr.

Sheffield Steel Corp.

The Kansas City Chapter heard Hiram Brown, chief metallurgist, Solar Aircraft Co., narrate an A.F.S. movie "Effect of Gating Design on Casting Quality", at the September meeting. Mr. Brown served on the A.F.S. group that sponsored this movie, a joint project of the American Foundrymen's Society and Battelle Memorial Institute.

The work described covered a series of experiments to determine the best designs for gates for casting metal in green sand. The work was done in an ingenious lucite model that could be varied by means of inserts. Gates tried were cylindrical and truncated cone form. Various wells and enlargements were added at the point where the gate joined the runner. The proportions of the rectangular runner were also changed. Water was used as a medium and high-speed movies determined the effectiveness of the designs in cleaning out trapped gases.

Mr. Brown pointed out that these designs were checked by casting in Woods metal and then in aluminum and the resulting castings were X-rayed for defects. He noted that similar work had been done in England using high-speed X-ray movies.

To Develop Aluminum Ore Reserves in Haiti

Reynolds Mining Corp., a wholly owned subsidiary of Reynolds Metals Co., has begun development of its aluminum ore reserves in Haiti. The principal desposits of the company are located about 80 miles from Port-au-Prince near the port of Miragoane. A natural protected harbor provides deep water facilities which will accommodate the largest modern self-unloading ore carriers. The deposits are five miles from deep water and extend over an area along a plateau approximately 2500 ft. above sea level.

Construction equipment has already been sent to Haiti to prepare the shore site and to build a 12-mile mountain road descending from an altitude of 3000 ft.; drying and loading facilities will be installed at the shore; and a pier will be constructed for loading all types of ore carriers.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Dec. 16	.....	H. P. Brown	Cancer and Our Environment
Boston	Dec. 4	Hotel Shelton	Carl Floe	Selection of the More Common Metals
Buffalo	Dec. 10	Hotel Sheraton	C. B. Post	Rare Earths
British Columbia	Dec. 7	Stanley Park		Past Chairmen's Night
Calumet	Dec. 8	Phil Smidt's	S. Marshall	Manganese Recovery From Slags
Canton-Massillon	Dec. 1	Mergus Restaurant	H. B. Osborn, Jr.	Induction Heating
Chicago	Dec. 14	Furniture Mart		Christmas Party
Cincinnati	Dec. 10	Eng. Soc. Hqd.	J. B. Austin	Magnification in Time
Cleveland	Dec. 7	Hollenden Hotel	L. B. Seltzer	Business
Columbus	Dec. 9	Battelle Memorial Institute	J. B. Austin	Metals of Tomorrow
Dayton	Dec. 9	Engineers Club	J. E. Goldman	Magnetic Materials
Detroit	Dec. 7	Elmwood Casino Windsor, Ont.		Christmas Party
Fort Wayne	Dec. 14	Howard Johnson's		Christmas Party
Georgia	Dec. 1	Georgia Tech		Southern Industrial Marketing
Golden Gate	Dec. 14	El Curtola	J. Gurski	Nonferrous Metals
Hartford	Dec. 4			Christmas Party
Indianapolis	Dec. 14	McClarney's		Ladies Night
Jacksonville	Dec. 14	Seminole Hotel		Aluminum
Lehigh Valley	Dec. 4	Hotel Traylor	W. R. Weaver	Quality Control Aids
Los Alamos	Dec. 22			Christmas Party
Louisville	Dec. 1	5 and 1 Club	J. B. Austin	National Officers Night
Mahoning Valley	Dec. 8	V. F. W.	J. B. Austin	National Officers Night
Milwaukee	Dec. 11	Nightingale Ballroom		Stag Party
Minnesota	Dec. 11	Minn. Athletic Club		Christmas Party
Montreal	Dec. 7	.....	M. Lavigne	Harnessing Atomic Power
New Haven	Dec. 18	Red Lobster, Milford		Christmas Party
New Jersey	Dec. 14	Essex House		Christmas Smoker
New York	Dec. 14	Schwartz's	J. B. Austin	Magnification in Time
Notre Dame	Dec. 9	Engineering Bldg.	H. S. Avery	Abrasion Resistant Alloys
Oak Ridge	Dec. 12	Oak Terrace		Christmas Party
Ontario	Dec. 4	Hamilton	F. G. Tatnall	Testing Up-to-Date
Penn State	Dec. 8	Penn State College	L. F. Coffin, Jr.	Mechanism of Fatigue
Philadelphia	Dec. 18	Penn Sheraton		Christmas Party
Philadelphia-Jr. Section	Dec. 5	Germantown Cricket Club		Dinner-Dance
Pittsburgh	Dec. 11	Ft. Pitt Hotel		Christmas Party
Purdue	Dec. 15	Purdue Memorial Union	H. J. Gomberg	Radioactive Tracers and Autoradiography in Metallurgy
Rhode Island	Dec. 2	Eng. Soc. Bldg.	J. H. Moore	Vacuum Technology
Rochester	Dec. 14	Elks Club	H. R. Neifert	Relation of Metallurgy and Design
St. Louis	Dec. 12	Congress Hotel		Christmas Dinner-Dance
Syracuse	Dec. 1	Onandaga Hotel	G. J. Guarnieri	Alloys for High Temperature Service
Texas	Dec. 1	Ben Milam Hotel	W. F. Oxford, Jr.	Corrosion in Oil Wells
Toledo	Dec. 12	Maumee River Yacht Club		Christmas Party
Tri-City	Dec. 1	Rock Island Arsenal		Recent Developments in Titanium
Utah	Dec. 16	Newhouse Hotel		Christmas Party
Washington	Dec. 14	Naylor's Rest.	P. Cambourelis	Titanium Processing and Fabrication
West Michigan	Dec. 14	Lock's Rest.	W. J. Jabsen	Panel Discussion
Western Ontario	Dec. 11	Cobblestone Inn, London	Panel	Stamping
Wichita	Dec. 11	K. of C. Hall		Christmas Party
Worcester	Dec. 9	Hickory House	S. G. Fletcher	Toolsteels
York	Dec. 9	Lancaster, Pa.	Gregory Comstock	Powder Metallurgy and Cemented Carbides

General Report on ASM-SLA Literature Classification

The widespread acceptance of the ASM-SLA metallurgical literature classification, established in 1950 by a joint committee of the American Society for Metals and the Special Libraries Association, is indicated by recent reports of its growing use in this country as well as abroad.

On a visit to the United States in September, Prof. Antonio Scortecci, research director of Finsider (holding company for Italian Steel Works) and chairman of the Bibliographic Committee of the Italian Association of Metallurgy, reported that the classification is being adopted as a standard system by the Italian Association of Metallurgy. This Association is planning to provide a service for its members whereby literature references will be reproduced on cards headed by ASM-SLA code symbols; these will be multigraphed and circulated gratis to members.

The classification has also been adopted by the British Iron and Steel Research Association for use in conjunction with its extensive information service. Selection of the ASM-SLA method was made by both BISRA and the Italian Association of Metallurgy only after careful study of other available systems. The reasons for the choice of this system by BISRA were outlined in a paper presented by P. E. Colinese, assistant information officer, before the annual fall meeting of Aslib (Association of Special Libraries and Information Bureaus) in Great Britain.

Sale of the punched cards used in conjunction with the classification system has now passed the one million mark, according to reports received from the card manufacturer. The list of purchasers includes shipments to France, Norway, Spain, Switzerland, Germany, Australia and Japan.

The present stock of cards is exhausted, and in ordering a reprint the manufacturer has found it necessary to revise the price schedules somewhat in line with the increased cost of materials and handling. The new price list is as follows:

CARD PRICES

Minimum order — 1M	
1 M through 4 M—	$22.50
5 M through 9 M—	19.80
10 M through 24 M—	18.60
25 M up	17.50

f.o.b. Chicago or San Francisco
Terms: Net, 10 days

Cards should be ordered from the distributor, namely, Lee F. Kollie Associates, Inc., 236 North Clark St., Chicago 1, Ill.

Review Courses Offered

Fenn College, Cleveland, will offer a six-week review course to assist engineers planning to take the Ohio State Professional Engineers' License Examination next February.

The course, under the supervision of Robert W. Schindler, professor of electrical engineering, will be taught by faculty members from the various engineering departments at the college. It will be given in two divisions —a general survey of mathematics, physics and general science; and a major review of chemical, civil, electrical or mechanical engineering.

Starting dates for the two divisions are Dec. 2 and Dec. 4 respectively, and classes will be held on Wednesday and Friday evenings from 8:10 to 9:50 pm.

Registration dates are Nov. 30, Dec. 1 and 2 at the Fenn School of Engineering, East 24th and Euclid. Tuition for the entire course is $26, but either the "General Review" or the "Major Field Review" may be taken alone for a tuition of $16.

Further information may be obtained from the Office of the Dean of Engineering, Fenn College, Cleveland, Ohio. Application forms which must be sent to the State Board of Registration for Professional Engineers and Surveyors by Dec. 1 are available at the dean's office.

Students Receive Science Achievement Awards

A. S. M.-Sponsored Science Achievement Awards Have Become One of the Highlights in the Fall Programs of Many Schools. A typical example are ceremonies recently conducted at Upper Haven Junior High School, Evanston, Ill. Shown just after the Awards were presented are, from left, rear: A. Lazow, Steve Hall, Louise Hollweg, science teachers; Helen Sanford, principal; not named; H. E. Brown, N.S.T.A.; and Otto Zmeskal, chairman, Chicago Chapter. Center, from left: Karl Barthelmess, honorable mention; Eugene Mohr, second place; Alden Campbell, first place; and Robert McLean, honorable mention. Front, from left: Harris Sullivan, honorable mention; Sandra Mueller, first place; Buckley Smith, honorable mention; and Ronnie Larsen, honorable mention. All the awards were made to students in either the 7th or 8th grades.. In center background is the design of a microscope submitted by Alden Campbell. In front of the microscope are the winning awards of Sandra Mueller (Dissecting Animals), and Eugene Mohr (Geiger Counter)

New Films

Metallurgy Plus

A 14-minute Kodachrome movie designed to supplement Republic Steel Corp.'s "The Story of Stainless", takes the viewer on a fast moving trip through the mills that make Republic's ENDURO stainless steel. Information on how to obtain this film for showing to associates, employees or groups can be obtained by writing to: M. H. Schmid, manager of sales, Republic Steel Corp., Alloy Steel Division, Massillon, Ohio.

Mechanical Engineering

A feature-length film in color about training, job opportunities and the future of the mechanical engineering field, has been produced by the School of Engineering, Michigan State College. Designed primarily for showings before high-school groups interested in engineering careers, the film includes scenes of training on the M.S.C. campus and professional engineers at work in Michigan industrial plants.

Information about the film and its availability can be obtained by writing to Department of Information Services, Michigan State College, East Lansing, Mich.

It's Only the Beginning

A 10-min., 16 mm. color-sound picture telling the story of industrial research and its contribution to the ultimate consumer is now available on a free loan basis from the Scientific Apparatus Makers Association, 20 North Wacker Drive, Chicago 6, Illinois.

The movie emphasizes the tremendous cost of industrial research and its importance to progress. It illustrates in an unusual and interesting manner how basic and applied industrial research is financed through corporate profits.

A. O. Smith Opens Plant

The A. O. Smith Corp. of Milwaukee has announced the opening of a new welding electrode plant at Lancaster, Pa. The output of this new one-million dollar plant will be distributed mainly in the eastern and southeastern markets.

The 41,000 sq. ft. floor surface of this new plant is fully vacuum-cleaned every 24 hr., and details of its construction and equipment make it the most modern plant existing for its purpose. Along with optimum manufacturing conditions in the new plant, to be known as the Welding Products Division, have been incorporated the best possible conditions of plant safety, comfort and efficiency, and the lowest maintenance costs.

Canton-Massillon Offers Course on Machinability

The Canton-Massillon Chapter is holding an educational series of lectures on "Machinability". The lectures, to be held once a week from Oct. 29 through Dec. 2, are based on the A.S.M. techbook, "Machining—Theory and Practice". While the lectures were designed to interest the man in the machine shop, the Chapter feels the course will be valuable to all those associated with the subject of machinability.

The date, subjects and speakers for the six lectures are:

Oct. 29—"Metal Cutting: Art to Science" and "Metal Cutting Research—Theory and Application", by M. E. Merchant, Cincinnati Milling Machine Co.

Nov. 4—"Cutting Fluid Theory", by John Foutch, Timken Roller Bearing Co.

Nov. 11—"Materials and Machinability", "Heat in Metal Cutting", and "Evaluation of Machinability of Rolled Steels, Forgings and Cast Irons", by F. W. Boulger, Battelle Memorial Institute.

Nov. 17—"Metallurgy and Machinability of Steels", "Toolsteels", and "Cemented Carbide Tool Materials", by J. D. Armour, Union Drawn Steel Div., Republic Steel Corp.

Nov. 24—"Some Metallurgical Aspects of Grinding", by Walter Littmann, Massachusetts Institute of Technology.

Dec. 2—"Practical Machining", by W. H. Splinter, Republic Steel Corp.

The lectures are open to anyone interested in machining. The course is offered as a service to the Chapter's sustaining members in an effort to fulfill the educational aims of A.S.M. A charge of $10 will be made for each registration, but if five of the six lectures are attended, the only charge will be the cost of the text and operating expenses, and the balance of $4 will be returned to the individual or company which is sponsoring him.

Toronto Offers Courses In Physical Metallurgy

The University extension department of the University of Toronto, in conjunction with the Ontario Chapter A.S.M., will present four courses in physical metallurgy this year. The courses being given, each consisting of four lectures, are:

Structure of Metals; Heat Treatment of Steel; Solidification and Cast Iron; and Nonferrous Metals.

The lectures, which began on Oct. 13, will be held every Tuesday and Thursday evening. The enrollment fee for the four courses is $15. Anyone wishing to take the courses should contact W. R. Kirk at the University extension department.

Joint ASM-AFS Student Meeting

Reported by Tom Bruns
Missouri School of Mines and Metallurgy

The student chapter at Missouri School of Mines and Metallurgy held a joint meeting with the A.F.S. student chapter at the first meeting of the current school year.

A. W. Schlechten, chairman of the metallurgy department, opened the meeting by introducing the faculty members of his department. The floor was then turned over to the A.F.S. chairman, Ralph Hollocher, who gave a short talk about his organization. Mr. Hollocher then turned the meeting over to the A.S.M. chairman, Anthony Selvaggi, who opened his talk by introducing his fellow officers; Dick Stevens vice-chairman, Dan Groteke secretary, and Don Haber, treasurer. Mr. Selvaggi gave a short talk about the A.S.M. and its activities. He described the Society's origin and growth, and pointed out that the A.S.M is the largest group of its kind, with a membership of over 22,000, and explained the new $2000 award for "outstanding performance in the teaching of metallurgy", which was won by Dr. Schlechten of the School of Mines in 1952, and which is now a part of the general educational program of the Society.

The guest speaker, Dean Curtis L. Wilson, presented a talk on "The Future of Metallurgy". Dean Wilson graduated from Montana School of Mines, and obtained a Ph.D. degree from the University of Goettingen. His early work in the field was spent in Butte, Mont., as a research engineer for the Anaconda Copper Corp. He returned to Montana School of Mines to become head of the department of metallurgy, and in 1942, Dr. Wilson was appointed dean at M.S.M., the position he presently holds.

The Dean pointed out the need for exploration, substitution, conservation, and technology as a means of extending the natural resources of the world. He showed the need for constant research and stated that Russia could never compete with the free world in research due to the strict regimentation of the workers.

IMPORTANT MEETINGS *for December*

Dec. 1-4 — National Association of Corrosion Engineers. Corrosion Conference, University of Oklahoma. (A. B. Campbell, Executive Secretary, N.A.C.E., 1061 M & M Bldg., Houston 2, Texas)

Dec. 13-16 — American Institute of Chemical Engineers. Annual Meeting, Hotel Jefferson, St. Louis, Mo. (F. J. Van Antwerpen, A.I.C.E., 120 East 41st St., New York 17, N. Y.)

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Fred Body, Norma King, Thelma Sparks and Members of the Translation Group

A
General Metallurgical

277-A. The Outlook for Galvanized Sheet Steel in 1953. B. P. Finkbone. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 21-30. (A4, CN)

278-A. Zinc. A European Survey. R. Lewis Stubbs. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 66-84.
Development of the industry, features of European production, consumption and trends. Graphs. (A4, Zn)

279-A. World Situation in Zinc. S. D. Strauss. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 90-99.
Market trends. Graph, table. (A4, Zn)

280-A. United States Slab Zinc Supply and Consumption in 1953. Howard L. Young. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 103-109. (A4, Zn)

281-A. Ion Exchange Process for Recovery of Gold From Cyanide Solution. F. H. Burstall, P. J. Forrest, N. F. Kember, and R. A. Wells. *Industrial and Engineering Chemistry,* v. 45, Aug. 1953, p. 1648-1658.
Stepwise process for separating Au and Ag from other heavy metals. Tables, diagrams, graphs. 8 ref. (A8, Au, Ag)

282-A. Industrial Research as a Tool of Industry. S. L. Hoyt. *Metal Progress,* v. 64, July 1953, p. 75-78.
History, importance and uses of industrial research. (A9)

283-A. Pravda Reports on Russia's Progress in Ferrous Metallurgy. *Metal Progress,* v. 64, Aug. 1953, p. 125-128.
Digest of "The Important Tasks of Technical Progress in Ferrous Metallurgy", by I. P. Bardin, *Pravda,* May 27, 1953. Achievements of Russian iron and steel industry between 1940 and 1951. (A general, Fe)

284-A. (Czechoslovakian.) **Classification of Scrap Metal.** Jaroslav Malkovsky. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 398-401.
Method of classifying Cu and Cu alloy scrap. Tables, diagrams. 5 ref. (A8, Cu)

285-A. (German.) **Economics of Lead in South America.** Walter Gehr. *Metall,* v. 7, nos. 13-14, July 1953, p. 560-561.
Figures on reserves and industry of Pb in various South American countries. Tables. (A4, Pb)

286-A. (German.) **Iron-Producing Industry in Soviet East Germany.** *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1135-1140.
Development of the industry since the end of the war and its status at the present time. Compares present status with conditions at the beginning of the 1951-55 five-year plan. Tables. 2 ref. (A4, Fe)

287-A. (English.) **Brief Outline of Steel Industries in Some Latin-American Countries.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.O, 1952, 23 p. Published jointly by ECLA-TAA for United Nations.
Brief outline of existing iron and steel industries and resources in seven Latin American countries. Tables, maps. (A4, B10, Fe, ST)

288-A. (English.) **The Balance of Materials and the Economic Comparison of the Different Steel Making Processes.** E. Krebs. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.56, 1952, 20 p. Published jointly by ECLA-TAA for United Nations.
Compares the operational economy of various steelmaking processes. Tables, diagrams, graphs. (A4, D general, ST)

289-A. (English.) **Comparative Investment Costs for Different Steelmaking Processes.** C. F. Ramseyer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.53, 1952, 23 p. Published jointly by ECLA-TAA for United Nations.
A study of the relative capital investments required to make steel by different processes. Tables. (A4, D general, ST)

290-A. (English.) **Factors Influencing Iron and Steel Consumption in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.86, 1952, 60 p. Published jointly by ECLA-TAA for United Nations.
General trends in the total demand for iron and steel products in six Latin American countries. Tables, graphs. (A4, ST)

291-A. (English.) **Influence of Local Factors on the Iron and Steel Industry in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/-ECLA/CONF. no. 1/L.87, 1952, 58 p. Published jointly by ECLA-TAA for United Nations.

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Influence of all factors relating to geography, raw materials and wage rates on costs and investments. Tables. (A4, A5, ST)

292-A. (English.) **Influence of the Size of the Markets on the Iron and Steel Industry in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.91, 1952, 36 p. Published jointly by ECLA-TAA for United Nations.
Influence of size of markets on costs and investments. Tables, graphs. (A4, ST)

293-A. (English.) **Preliminary Information Regarding Costs of Several Factors of Interest to the Iron and Steel Industry.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.89, 1952, 10 p. Published jointly by ECLA-TAA for United Nations.
Compilation of data dealing with the cost of important factors in the development of iron and steel industry. Tables. (A4, ST)

294-A. (English.) **Selection of Steelmaking Processes and of Locations for Integrated Iron and Steel Works.** Wm. A. Haven. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.52, 1952, 20 p. Published jointly by ECLA-TAA for United Nations.
Considerations and circumstances leading to establishment of plants in Brazil and Colombia. Tables, maps. (A4, D general, B10, ST)

295-A. (English.) **Some Aspects of Labor Problems in the Iron and Steel Industry. I. Industrialization and Social Policy. II. The Work of the International Labor Organization in the Iron and Steel Industry. III. Conclusions of the Iron and Steel Committee Regarding Problems in the Iron and Steel Industry. IV. Future Prospects.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.81, 1952, 13 p. Published jointly by ECLA-TAA for United Nations. (A5, ST)

296-A. (English.) **Some Suggestions for Increasing the Iron and Steel Industry in Latin America.** Pablo Sada. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.84, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.
Brief history of a steel plant built under difficult conditions. Outstanding results achieved. Tables. (A5, ST)

297-A. (English.) **Structure of the Steel Transforming Industry in Latin America.** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.88, 1952, 63 p. Published jointly by ECLA-TAA for United Nations.
Preliminary economic data on the role played by iron and steel industries in the economics of certain Latin American countries. Tables. (A4, ST)

298-A. (English, French.) **Notes on the Ugine-Sejournet Extrusion Proc-**

ess. J. Sejournet. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/-CONF. no. 1/L.68, 1952, 9 p. Published jointly by ECLA-TAA for United Nations.

New techniques in the extrusion process. Presents hourly rate and production costs. (A4, F24)

299-A. (English, Spanish.) **Consumption of Iron and Steel Products in Mexico.** Marcelo G. Aramburu. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.83, 1952, 50 p. Published jointly by ECLA-TAA for United Nations.

Production, consumption, imports, exports and markets. Tables, graphs. (A4, ST)

300-A. Swarf Recovery. E. R. Thews. *Metal Progress,* v. 64, Sept. 1953, p. 194.

Condensed from "Metallurgical Treatment of Swarf", *Metal Industry,* Dec. 21, 1952, p. 521; Dec. 28, 1952, p. 535; Jan. 4, 1953, p. 7. Recovery processes for nonferrous scrap metal. (A8, EG-a)

301-A. (Pamphlet.) **Annual Report of the Board of Directors.** American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 1953, 48 p.

Complete annual report on the activities of the ASTM. (A9)

302-A. (Book.) **Dust in Industry.** 175 p. 1948. Society of Chemical Industry, 56, Victoria St., London S.W.1. $2.20.

Papers read at the Conference at Leeds, Sept. 28-30, 1948. Discusses dust problems in metal, chemical, and textile industries as well as explosion problems. (A7, A5)

303-A. (Book.) **Metal Industry Handbook and Directory.** 465 p. 1953. Louis Cassier Co., Ltd., Dorset House, Stamford St., London S.E.1, England. Available only with weekly journal *Metal Industry* at combined subscription of $7.45.

Annual edition covers properties of nonferrous metals. Includes summaries of British Standard, Aircraft Material and D.T.D. specifications, and metal finishing processes. (A10, S22, L general)

304-A. (Book.) **Quin's Metal Handbook.** K. V. Henderson, editor. Ed. 39. 752 p. 1952. Metal Information Bureau, Ltd., Princes House, 39 Jermyn St., London S.W.1, England. (Available from Technical Bookshop of *Mining Magazine,* 482, Salisbury House, London E.C.2.) 25s.

Statistical data, definitions, and general review of metalworking. (A general)

305-A. (Book—German.) Klingelnberg, Technical Handbook.) **Klingelnberg, Technisches Hilfsbuch.** Rev. ed. 13. Walter Krumme and Rudolf Reindl. 890 p. 1953. Verlag Stahleisen m. b.H., Postfach 2590, Düsseldorf, Germany. 19.80 DM.

Mathematics; measures and units; materials; metal protection; precision measurements; elements of machines; standard coefficients and standard revolutions; and organizational shop questions. (A general, S22)

306-A. (Book—English, Spanish, French.) **Expert Working Group on Iron and Steel Industry in Latin America.** Bogota Conference, Bogota, Colombia, Oct. 13-Nov. 5, 1952. Economic Commission for Latin American and Technical Assistance Administration. United Nations Secretariat, New York City.

Sixty-four individual papers concerning fuels, technical problems, and economic factors relating to iron and steel production. (A4, B10, D general, Fe, ST)

B

Raw Materials and Ore Preparation

177-B. Flotative Properties of Titanium Minerals in Oleate Solutions. V. S. Pradhan and D. W. Mitchell. *California Journal of Mines and Geology,* v. 49, July 1953, p. 269-272.

Results of captive bubble and batch flotation tests. Tables, graphs. 12 ref. (B14, Ti)

178-B. Factors Affecting Ore Separations in a 4-In. DSM Cyclone Separator. Earl C. Herkenhoff. *Engineering and Mining Journal,* v. 154, Aug. 1953, p. 88-91.

Information on medium and ore flows when minus-¼-in. low-grade Fe ores are treated in cyclone separators. Diagrams, tables. (B14, Fe)

179-B. Magma Copper Uses Factorial Design for Better Testing. F. T. Davis and A. C. Dorenfeld. *Engineering and Mining Journal,* v. 154, Aug. 1953, p. 97-99.

Importance of significant testing procedures for flotation reagents. (B14, Cu)

180-B. Sintering and Pelletizing. *Iron and Steel,* v. 26, Aug. 1953, p. 395-396.

Application in ore preparation and blast furnace research. (B16, D1)

181-B. Iron and Steel on the Move. Clyde Williams. *Monthly Business Review,* v. 35, Aug. 1953, p. 12.

Changing pattern of iron ore supply. Table. (B10, Fe, ST)

182-B. Rare Metals. Their Production and Utilisation. *Australasian Engineer,* 1953, July, p. 41-45.

Includes "Beach Sand Mining in Southeastern Queensland", O. D. Paterson; "Factors Controlling the Occurrence of Heavy Mineral Beach Sand Along the Queensland and New South Wales Coasts", O. A. Jones; and "Concentration of Beach Sand Minerals", K. S. Blaskett. Table. (B general, Zr, Ti, EG-b)

183-B. A Review of the Effects of Titanium and Zirconium in Steel. L. C. Bogan. *Australasian Engineer,* 1953, July, p. 51-55.

Uses as scavenging agents and alloying elements. (B22, Zr, Ti, ST)

184-B. Research and the Minor Constituents of Steel. John Chipman. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1057-1064, 1106.

The Charles M. Schwab Memorial Lecture, presented before the General Meeting of AISI, New York, May 27-28, 1953. Research on effects of S, P, N_2, residuals, Mn, B, V, O_2, deoxidizers, C and H_2 in steel. Graphs. (B22, Q general, ST)

185-B. Rod Milling at Snow Lake. B. G. MacDeermid. *Canadian Mining and Metallurgical Bulletin,* v. 46, no. 497, Sept. 1953, p. 535-544; disc., p. 544-546; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 56, 1953, p. 271-282.

Equipment and performance data for the first 3½ years of service with emphasis on control of rod slippage. Photographs, tables, diagrams. (B13)

186-B. The Hollinger Crushing Plant. *Canadian Mining and Metallurgical Bulletin,* v. 46, no. 497, Sept. 1953, p. 550-575; disc., p. 575-576; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 56, 1953, p. 286-312.

Equipment and costs of crushing and handling Au ore since 1941. Tables, charts, photographs, diagrams. (B13, Au)

187-B. Modern Techniques in Non-Ferrous Ore Dressing. *Chemical & Process Engineering,* v. 34, Aug. 1953, p. 245-247.

Report of the mission to the U. S. of the Organization for European Economic Co-Operation extracted. (B13, B14, EG-a)

188-B. New Metals and Alloys Plant. *Chemical Engineering,* v. 60, Sept. 1953, p. 134, 136, 137.

New Electromet plant at Marietta, Ohio. The "Simplex" process is mentioned. Photographs. (B22, Fe-n)

189-B. The Fluidized-Bed Sulfate Roasting of Nonferrous Metals. Frank M. Stephens, Jr. *Chemical Engineering Progress,* v. 49, Sept. 1953, p. 455-458.

Equipment which permits isolation of Cu and Co sulfates while Fe is in an insoluble oxide form. Photograph, graph, tables. (B15, Co, Cu)

190-B. Ferrocoke. Gwynne Cellan-Jones. *Coke and Gas,* v. 15, Sept. 1953, p. 315-320.

Production and uses. Results of experimental work on developing a coke-ore mixture satisfactory for blast-furnace burden. (B22, D1, Fe)

191-B. Ammonia; Ammonium Carbonate Leaching of Low Grade Zinc Ores. William J. Wendt. *Engineering and Mining Journal,* v. 154, Sept. 1953, p. 84-90.

Properties of NH_3, $(NH_4)_2CO_3$ solutions as solvent. Chemistry of the process, precipitation of Zn, effect of CO_2, construction materials and operating costs. Graphs, diagram. 6 ref. (B14, Zn)

192-B. Factors Affecting Ore Separations in a 4-In. DSM Cyclone Separator. II. Earl C. Herkenhoff. *Engineering and Mining Journal,* v. 154, Sept. 1953, p. 95-99, 206.

Procedure for standardizing ore separation tests. Diagram, tables. 6 ref. (Concluded.) (B14, S22)

193-B. A Corrected Interpretation of the Mechanism of Growth of Magnetite During Oxidation. M. H. Davies, M. T. Simnad, and C. E. Birchenall. *Journal of Metals,* v. 197, 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1250.

Corrects original interpretation. (B15, Fe)

194-B. B.I.S.R.A.'s North-East Coast Laboratories. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 67-69.

Research on pelletizing, sintering, permeability and carbon hearths. Use of radioactive tracer techniques in research on blast furnaces. (B16, D1, S19, Fe)

195-B. From Ore Testing to Cost Estimation. *Mining Engineering,* v. 5, Sept. 1953, p. 868-875.

Includes "Ore Testing to Determine Flowsheet Prior to Plant Design", Bruce Irwin, V. L. Mattson, Gene Meyer and S. Power Warren; "Fundamentals of Mill Design", H. L. McNeill; "The Value of Ore Bedding Systems", Warren L. Hawes; and "Methods of Estimating Plant Construction Cost", H. V. Hughes. Photographs. (B general, A4)

196-B. Mining and Milling of Lithium Pegmatites at Kings Mountain, N. C. E. R. Goter, W. R. Hudspeth, and D. L. Rainey. *Mining Engineering,* v. 5, Sept. 1953, *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 196, 1953, p. 890-893.

Plant layout, equipment, past and present mining techniques and flotation procedure. Photographs, diagram. (B12, B13, B14)

197-B. Minas de Iguala's 1,000-Ton-Per-Day Mill at Parral Treats Esmeralda Lead-Zinc Ore. II. Robert L.

Burns. *Mining World,* v. 15, Sept. 1953, p. 52-55.

Operations including Pb and Zn flotation. Photographs, tables, diagrams. (B14, Pb, Zn)

198-B. Agstone. By-Product of Zinc and Lead Processing. L. David Minsk. *Rock Products,* v. 56, Aug. 1953, p. 188, 190.

Recovery of a dolomitic agricultural limestone from tailings in processing ore. Photographs. (B general, A8, Zn, Pb)

199-B. The Metallurgical and Refractory Applications of Chromite and Chromium. R. A. Dodd. *South African Mining and Engineering Journal,* v. 64, pt. 1, Aug. 22, 1953, p. 1025, 1027.

Occurrence, properties and uses of the ore. Applications of metallic Cr in ferro-alloys, steels and heat resisting alloys. (B19, B22, T general, Cr)

200-B. Concentration of Klukwan, Alaska, Magnetite Ore. R. R. Wells and R. L. Thorne. U. S. Bureau of Mines, Report of Investigations no. 4984, June 1953, 15 p.

Ore samples and laboratory methods of concentration. Tables. (B14, B11, Fe)

201-B. Concentration Tests of Manganese Ores. A. L. Engel. U. S. Bureau of Mines, Report of Investigations no. 4985, June 1953, 14 p.

Ores from various locations. Considers gravity concentration and flotation. Tables. (B14, Mn)

202-B. The Future of Birmingham Red Iron Ore, Jefferson County, Ala. I. History and Ore Reserves. J. R. Thoenen and Avery H. Reed, Jr. **II. Concentration.** B. H. Clemmons. U. S. Bureau of Mines, Report of Investigations no. 4988, July 1953, 71 p.

History and ore reserves. Magnetic separation, differential grinding, gravity concentration, and flotation. Tables, photographs. (B10, B13, B14, Fe)

203-B. (English.) **Argentine Asphaltites as Blending Material for Poorly Coking Coals.** Alfred R. Powell. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.17, 1952, 6 p. Published jointly by ECLA-TAA for United Nations.

Study of three asphaltites for use in blending with poorly coking coals. Tables. 3 ref. (B18)

204-B. (English.) **Coal Washery Performance as Related to Blast Furnace Costs.** John D. Price. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.26, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Preferred method by which the optimum efficiency point of impurity removal of coal may be determined. 9 ref. (B18, D1)

205-B. (English.) **Description of Chilean Coals Used in the Steel Industry.** Alfredo Gonzalez. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.6, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Chilean coal production and characteristics and use in steelmaking. Tables. (B18, D general)

206-B. (English.) **Improving Coking Qualities of Coal by Addition of Various Materials.** Alfred R. Powell. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.15, 1952, 20 p. Published jointly by ECLA-TAA for United Nations.

Studies to improve coke quality by blending various materials with weakly coking coals. Tables. 8 ref. (B18)

207-B. (English.) **Metallurgical Coke From Chilean Coals.** Américo Albala. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.21, 1952, 26 p. Published jointly by ECLA-TAA for United Nations.

Resume of investigations on the coking properties of Chilean coals for use in steel mill operations. Tables. (B18)

208-B. (English.) **Notes on the Production of Metallurgical Coal in Brazil.** Alvaro De Paiva Abreu. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.5, 1952, 14 p. Published jointly by the ECLA-TAA for United Nations.

Quality of coal produced in Brazil and problems in processing. Tables. (B18)

209-B. (English.) **Production of Metallurgical Coke in Mexico.** Salvador Cortés Obregon. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.20, 1952, 5 p. Published jointly by ECLA-TAA for United Nations.

Production of coke and results of tests to determine quality. Tables. (B18)

210-B. (French.) **Preparation of the Charge for Blast Furnaces Using Lorraine Minettes.** Paul Thierry. *Metallurgie et la construction mecanique,* v. 85, no. 7, July 1953, p. 543-545.

Crushing of the ore and agglomeration of the fines. (To be continued.) (B13, Fe)

211-B. (German.) **Production, Properties, and Use of Brown Coal High-Temperature Coke.** Heinz Wubbenhorst. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1117-1118.

A low-temperature distilling technique for producing metallurgical fuel. Diagrams, photograph, table. 4 ref. (B18)

212-B. (German.) **Status and Development of Blende Roasting at Nievenheim Zinc Works of Stolberger Zinc Co.** Gottfried Haufe and Heinz Jahn. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 7, July 1953, p. 249-257.

Processing and physical plant of Nievenheim Works. Scrap testing and apparatus used. Tables. 6 ref. (B15, A8, Zn)

213-B. (Russian.) **Peculiarities of the Reducing Magnetization Process of Oxide Iron Ores.** V. A. Roiter, V. I. Karmazin, V. A. Iuza and A. N. Kuznetsov. *Zhurnal Fizicheškoi Khimii,* v. 27, no. 1, Jan. 1953, p. 125-129.

Conditions promoting step reduction of oxides. Graphs, table. (B14, Fe)

214-B. (Spanish.) **Iron Ore, Coal, and Limestone Deposits Studied With Respect to Their Use in the Iron and Steel Industry of Colombia.** Benjamin Alvarado. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.28, 1952, 30 p. Published jointly by ECLA-TAA for United Nations.

General description of the most important Colombian deposits and extent of exploitation. Tables. (B10, Fe)

215-B. (Spanish.) **Mixtures for the Production of Metallurgical Coke in the Western United States.** John D. Price. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.12, 1952, 35 p. Published jointly by ECLA-TAA for United Nations.

Possibility of correlating work accomplished elsewhere with the improvement of the coke made from Latin American coal. Compares coals from the Western U. S. with those in Latin America. Charts. (B18)

216-B. Constitution of the FeO-Fe_2O_3-SiO_2 System at Slagmaking Temperatures. R. Schuhmann, Jr., R. G. Powell, and E. J. Michal. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institution of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1097-1104.

Liquidus surfaces in FeO-Fe_2O_3-SiO_2 system were determined from 1250 to 1450° C. by equilibrating small samples in Pt crucibles, quenching and microscopic examination. Experimental results were combined with previously published information to construct a ternary diagram for the system showing the entire temperature-composition range of stability of iron silicate slags. Metallurgical applications of the diagram, especially in Cu smelting. Micrographs, diagrams. (B21, Cu, Fe)

217-B. (Book.) **Lake Superior Iron Ores.** Ed. 2. 334 p. 1952. Lake Superior Iron Ore Assoc., Hanna Building, Cleveland, Ohio.

Statistical record of the individual mining properties in the Lake Superior District, supplemented by maps and tables relating to the Lake Superior iron ore industry and to iron ore generally (B10, B12, Fe)

218-B. (Book—German.) **Sulfur. System no. 9, Gmelin's Handbook of Inorganic Chemistry.** Sec. A2, 8th ed. 450 p. 1952. Verlag Chemie, G.m.b.H., Weinheim/Bergstrasse, West Germany. (Available from Walter J. Johnson, 125 E. 23rd St., New York.) $35.30.

A complete review and critical analysis of the occurrence and technology of S and S compounds, colloidal chemistry, and physiological phenomena. (B22)

219-B. (Book—German.) **Sulfur. System no. 9, Gmelin's Handbook of Inorganic Chemistry.** Sec. B1, 8th ed. 372 p. 1953. Verlag Chemie, G.m.b.H., Weinheim/Bergstrasse, West Germany. (Available from Walter J. Johnson, 125 E. 23rd St., New York.) $29.40.

Discusses derivation of H_2S, its physical properties, and its chemical behavior. Includes combustion of H_2S and its reactions with metals. (B22)

220-B. (Book—German.) **(The Metallurgy of Ferro-Alloys.) Die Metallurgie der Ferrolegierungen.** R. Durrer and G. Volkert. 409 p. 1953. Verlag Stahleisen m.b.H., Postfach 2590, Düsseldorf, Germany. 72 DM.

General and special metallurgy of the ferro-alloys. Furnace construction and electrical installation. (B22, D5)

C

Nonferrous Extraction and Refining

142-C. Dollars From Dross. D. Hosie. *Canadian Metals,* v. 16, Aug. 1953, p. 14, 16.

New type of rotary crucible furnace for recovery of Cu alloys. Photograph. (C21, Cu)

143-C. How Northern Rhodesia Meets Rising Base Metal Demands. H. L. Talbot and F. H. Chapman. *Engineering and Mining Journal,* v. 154, Aug. 1953, p. 82-87.

Extraction processes for Co, Pb and Zn. Diagrams, photographs. (C general, Co, Pb, Zn)

144-C. Melting Systems for Aluminium. *Light Metals,* v. 16, Aug. 1953, p. 272-273.

Practices common in the Al industry for various forms of melting procedure. Melting for wrought products, scrap refining and production of castings, use widely differing techniques. Photograph. (C general, E10, Al)

145-C. Extraction Metallurgy. C. W. Dannatt and F. D. Richardson. *Metal Industry,* v. 83, July 24, 1953, p. 53-66.

Work on solubility of O in molten

Pb, thermodynamics of PbO-SiO_2 and, FeO-SiO_2-CaO mixtures, behavior of S in silicate and aluminate melts and diffusion in solids. Graphs, photographs.
(C general, D general, P12, Pb, S, Co, Fe)

146-C. Anhydrous Fluorides in Metallurgy. W. J. Kroll. *Metal Industry*, v. 83, July 31, 1953, p. 81-82; Aug. 7, 1953, p. 101-104; Aug. 14, 1953, p. 124-126; Aug. 21, 1953, p. 141-143.

Properties and chemistry of the fluorides; why they are applicable in metallurgy; production of various metal fluorides; examples; fluoride electrolysis. (C4)

147-C. Induction Furnaces. They Stir as They Melt Brass, Bronze. Frank T. Chesnut. *Steel*, v. 133, Aug. 24, 1953, p. 100-101.

Types, advantages and uses of induction furnaces. Table. (C21, Cu)

148-C. Vacuum Techniques in Metallurgy. W. J. Kroll. *Times Review of Industry*, v. 7, new ser; Aug. 1953, p. 26-28, 31.

Equipment for refining highly reactive metals. Diagrams. (C25)

149-C. Very Pure Metals. Advances in Chemical Technique. A. R. Powell. *Times Science Review*, Autumn 1953, p. 14, 16.

Chemical processes for extracting metals. (C general, D general)

150-C. (Hungarian.) **Recent Information on Matte.** Zoltan Horvath. *Aluminium (Budapest)*, v. 5, no. 4, April 1953, p. 78-84.

Binary and ternary systems which play a role in refining metals from sulfide ores. Equilibrium diagrams. Diagrams, graphs. 4 ref.
(C21, M24, Cu, Ni, Zn, Pb)

151-C. Vacuum Technique. S. L. Martin. *Chemical & Process Engineering*, v. 34, Sept. 1953, p. 276-279.

Vacuum pumps and gages, new techniques and production of Ta, Zr, Mo and Ti. Diagrams, photographs. 35 ref. (C25, Zr, Mo, Ti, Ta)

152-C. Direct Process Boosts Yield. *Chemical Engineering*, v. 60, Sept. 1953, p. 158, 160, 161.

Bureau of Mines' direct chlorination process for preparing Hf-free Zr. (C4, Zr)

153-C. Preparation of "Mischmetall" by Thermal Reduction. C. Decroly, D. Tytgat, and J. Van Impe. *Electrochemical Society, Journal*, v. 100, Sept. 1953, p. 388-391.

Preparation by thermal reduction of mixed fluorides using Ca as reducing agent. Diagrams, table. 12 ref. (C26, EG-g)

154-C. A Study of the Electrodeposition of Ruthenium From Very Dilute Solutions. M. H. Lietzke and J. C. Griess, Jr. *Electrochemical Society, Journal*, v. 100, Oct. 1953, p. 434-441.

Behavior of Ru in low concentrations. A mechanism is proposed. Tables, graphs. (C23, Ru)

155-C. Preparation of Yttrium and Some Heavy Rare Earth Metals. A. H. Daane and F. H. Spedding. *Electrochemical Society, Journal*, v. 100, Oct. 1953, p. 442-444.

Method for preparing massive Y, Tb, Dy, Ho, Er and Tm by Ca reduction. Estimated melting points. 13 ref. (C26, P12, EG-g, Y, Tb, Dy, Ho, Er, Tm)

156-C. The Preparation and Properties of Magnesium Alloy Sheets of Controlled Impurity Content. H. G. Cole and B. Walters. *Institute of Metals, Journal*, v. 82, Sept. 1953, p. 25-31.

Preparation and rolling of ingots of three commercial types of Mg alloy sheet. Results of corrosion and mechanical tests on sheets. Tables. 9 ref.
(C5, F23, R general, Q general, Mg)

157-C. Anode Casting Operations at Garfield Smelter Geared to High Production. N. R. Alston and M. J. Winkel. *Journal of Metals*, v. 5, sec. 1, Sept. 1953, p. 1075-1077.

Holding furnace, anode casting wheels, inspection, molds and design. Photographs. (C5, Cu)

158-C. Titanium. New Melting Process Improves Yield and Quality. *Light Metal Age*, v. 11, Aug. 1953, p. 16.

Process and its advantages. Photograph. (C general, Ti)

159-C. Electric Smelting of Non-Ferrous Metals. A. G. E. Robiette. *Metal Industry*, v. 83, Aug. 28, 1953, p. 161-165.

Ni and Cu matte production and Sn, Pb, and Zn smelting. Diagrams, table, photograph. 9 ref.
(C21, Ni, Cu, Sn, Pb, Zn)

160-C. Development of Commercial Vacuum Furnaces for Melting Metals and Alloys. James H. Moore. *Metal Progress*, v. 64, Sept. 1953, p. 161-164, 166.

Development from World War I to present. Diagrams. (C25, D8)

161-C. (German.) **Chlorinating of Aluminum Alloys.** K. E. Mann. *Aluminium*, v. 29, no. 7-8, July-Aug. 1953, p. 297-298.

Amount of Cl ash resulting from treatment of Al alloy melts with gaseous Cl was used to test various refining agents for effectiveness and to compare nonmetallic impurities of various melts. Photograph, table. (C4, Al)

162-C. (German.) **Production and Working of Purest Aluminum.** Werner Helling. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 6, no. 8, Aug. 1953, p. 310-317.

Fundamentals, techniques and uses. Photographs, graphs, diagrams, tables. 5 ref.
(C general, F general, Al)

163-C. (Hungarian.) **Possibilities of Extracting Rare Metals From the Basic and Supplementary Raw Materials of Alumina Production.** *Aluminium (Budapest)*, v. 5, no. 2, Feb. 1953, p. 45-48.

Investigations in Hungary.
(C general, Ce, Zr, Ga, Be, Th, Al)

164-C. (Portuguese.) **Description of a Furnace, Constructed by the Institute for Technological Research in Sao Paulo, for the Vacuum Distillation of Zinc Contained in Zinc-Silver Alloys.** Tharcisio D. de Souza Santos. *ABM (Boletim da associacao brasileira de metalais)*, v. 9, no. 30, Jan. 1953, p. 141-159.

Details of construction. Diagram, tables, photographs, graphs. 5 ref. (C22, Zn, Ag)

D
Ferrous Reduction and Refining

291-D. Steelmaking Reactions. III. Reactions of Phosphorus. P. T. Carter. *Iron and Steel*, v. 26, Aug. 1953, p. 387-392.

Slag-metal reactions. 44 ref.
(D general, Fe)

292-D. Experiences With Oxygen Control in Open Hearth Flue Gases. F. P. Hubbell. *Iron and Steel Engineer*, v. 30, Aug. 1953, p. 53-56; disc., p. 57-58.

Analyzing instruments. Diagrams. (D2, S11)

293-D. Ferromanganese Cleaning Plant Starts up on Duquesne Furnace. *Iron and Steel Engineer*, v. 30, Aug. 1953, p. 136, 139.

Equipment for removing dust from gas and processing the dust after removal. (D1, A5)

294-D. Some Factors Affecting Open-Hearth Steelplant Performance. J. S. Curphey. *Iron and Steel Institute, Journal*, v. 174, Aug. 1953, p. 305-316.

Hot metal practices, slagging, furnace design, refractory wear and human factors. Graphs, tables, diagrams. (D2, ST)

295-D. Studies in the Deoxidation of Iron. Deoxidation by Titanium. E. Ll. Evans and H. A. Sloman. *Iron and Steel Institute, Journal*, v. 174, Aug. 1953, p. 318-324.

Preparation, analysis and microscopical examination of a series of ingots made by adding O_2 and Ti in various amounts to 400-g. melts of pure Fe. Tables, micrographs. 11 ref. (D9, Fe)

296-D. Permeability Tests on Blast-Furnace Raw Materials. E. W. Nixon and F. R. Maw. *Iron and Steel Institute, Journal*, v. 174, Aug. 1953, p. 331-334.

Apparatus used to study permeability of burden materials. Possibilities of its use for practical and fundamental research. Diagrams, graphs. (D1)

297-D. Repair and Maintenance of Open-Hearth Furnaces in Germany. A. Mund and C. Kreutzer. *Iron and Steel Institute, Journal*, v. 174, Aug. 1953, p. 373-377.

Condensed from paper presented at Twenty-First Meeting of the ISE Group, Jan. 21, 1953, London. Methods for highest efficiency and durability. Graphs. (D2)

298-D. Open Hearth Challenged as More Carbon Steel Goes Electric. Allen G. Gray. *Steel*, v. 133, Aug. 24, 1953, p. 84, 86-88, 108.

Article based on Battelle report to Bituminous Coal Research Inc. Economics of the processes. Table, photographs. (D2, D5, CN)

299-D. Side-Blow Converter Refractories. Ralph A. Clark. *American Foundryman*, v. 24, Oct. 1953, p. 34-39.

Types, application methods, service conditions and repair of refractory linings. Photographs, diagrams, table. (D3, ST)

300-D. Determination of Arc Furnace Optimum Current. D. R. Cochran. *Blast Furnace and Steel Plant*, v. 41, Sept. 1953, p. 1031-1036.

Method for determining optimum current. Method in connection with efficient furnace operation. Tables, graphs, diagram. (D5)

301-D. Open Hearth Furnace Design and Availability. G. Reginald Bashforth. *British Steelmaker*, v. 19, Sept. 1953, p. 541-549.

Progress in steelmaking during past 30 years in respect to furnace design. Diagrams. 15 ref. (D2)

302-D. Arc Furnace Electrode Control. *British Steelmaker*, v. 19, Sept. 1953, p. 556-557.

Hydraulic electrode control and advantages. Photographs. (D5)

303-D. Production of Spheroidal-Graphite Cast Iron in a High-Frequency Furnace. B. Jones and R. Jelley. *Foundry Trade Journal*, v. 95, Sept. 10, 1953, p. 313-319.

Exploratory melts in an acid-lined electric furnace, citing advantages of electric method. Micrographs. (D6, CI)

304-D. The Manufacture of Silicon Capped Steel. Albert Lami. *Industrial Heating*, v. 20, Sept. 1953, p. 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1849.

A practice of effectively capping regular molds by the use of ferrosilicon. Table, photographs.
(D9, CN)

305-D. Steel Mill Refractories and Masonry. *Industrial Heating,* v. 20, Sept. 1953, p. 1803-1804, 1806.

Furnace uptake design and port-end construction. (To be continued.) (D general)

306-D. Open-Hearth Instrumentation. R. A. Lambert. *Instruments,* v. 26, Sept. 1953, p. 1370-1371, 1397-1402, 1404, 1406.

Data on the instrumentation for control of reversal, roof temperature, combustion air, fuel-air ratio and furnace pressure. Photographs, diagrams. (D2, S16, S18)

307-D. "Oxygen Steelmaking" Yields High-Quality Product. H. Malzacher and R. Walzel. *Iron Age,* v. 172, Sept. 24, 1953, p. 127-130.

New converter technique producing low N_2 steel comparable with openhearth steel. Diagrams, graphs, tables. (D3, CN)

308-D. Steelmaking Reactions. IV. Oxidation and Removal of Carbon. P. T. Carter. *Iron & Steel,* v. 26, Sept. 1953, p. 427-433.

C-O equilibrium in liquid Fe, mechanism of C-O reaction, factors affecting rate of C removal, use of O_2 and foaming. 82 ref. (D general, P12, ST)

309-D. Oxygen Activity in Iron Oxide Slags. Hugo Larson and John Chipman. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1089-1096.

Ferrous and ferric oxide concentrations of slags were established through gas-slag equilibrium at 1550° C. in a range of O_2 pressure at 10^{-1} to 10^{-9} atm. Oxygen pressure is shown graphically as a function of composition for slags which are analogous to those at the slag-gas interface of the openhearth furnace. Diagram, graphs. 16 ref. (D2, B21, P12, ST)

310-D. Induction Melting Furnaces. R. Lethen. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 421-424.

Design and construction of furnace for melting iron and steel using line frequency. Photographs, diagrams, table, graph. (Concluded.) (D6, ST)

311-D. Selection of Carbon Steel Bars. II. G. P. Witteman. *Steel,* v. 133, Sept. 21, 1953, p. 131-132, 135.

Amount of O_2 in steel prior to or during casting, to determine whether it is killed or nonkilled. Types are semikilled, rimmed, killed and capped. Photographs, tables. (D9, CN)

312-D. How to Curb Heat Losses From Cooling Units. A. M. Frankau. *Steel,* v. 133, Sept. 21, 1953, p. 138, 140.

Methods to prevent large heat losses in openhearth furnace chills and door frames. Tables. (D2)

313-D. (English.) **Pig-Iron Production in Blast Furnaces Using Charcoal.** Louis Ensch. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.31, 1952, 11 p. Published jointly by ECLA-TAA for United Nations.

Furnace operation relative to the development of an iron and steel industry in South America. Tables. 7 ref. (D1, CI)

314-D. (English.) **Operation of the Charcoal Blast Furnace at Corral Using Mixtures of Metallurgical Coke and Charcoal.** Danilo Vucetich. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.32, 1952, 9 p. Published jointly by ECLA-TAA for United Nations.

Brief history of the development and improvement of the blast furnace. Diagrams, graphs, tables. (D1)

315-D. (English.) **Notes on Production of Pig Iron.** G. Bulle. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.36, 1952, 4 p. Published jointly by ECLA-TAA for United Nations.

Use of coke blast furnaces in the production of pig iron. (D1, CI)

316-D. (English.) **Progress in the Manufacture of Pig Iron and Ferro-Alloys With the Low Shaft Electric Furnace.** Herman Walde. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.37, 1952, 18 p. Published jointly by ECLA-TAA for United Nations.

Advantages of electric furnace where hydro-electric power is available. Tables, graphs. 4 ref. (D8, Fe)

317-D. (English.) **Making of Steel in Electric Furnaces.** H. S. Newhall. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.38, 1952, 10 p. Published jointly by ECLA-TAA for United Nations.

Advantages of electric furnace over blast furnace. Cost of operation, initial cost and practical size. (D8, ST)

318-D. (English.) **The Krupp Renn Process.** Friedrich Johannsen. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.39, 1952, 16 p. Published jointly by ECLA-TAA for United Nations.

Krupp Renn process as it exists today and its advantages. Diagrams, tables, photographs. (D8, Fe)

319-D. (English.) **The Basset Process for the Production of Pig Iron in Rotary Kilns.** Knud E. Jensen. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.42, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Advantages and disadvantages. Tables. (D8, Fe)

320-D. (English.) **Production of Sponge Iron in a Rotary Kiln at Temperatures Below the Fusion Point of the Material.** Russell C. Buehl. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.44, 1952, 16 p. Published jointly by ECLA-TAA for United Nations.

Commercial production of sponge iron. Diagrams, tables. 25 ref. (D8, Fe)

321-D. (English.) **Considerations on the Development of the Production of Iron.** R. Durrer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.45, 1952, 8 p. Published jointly by ECLA-TAA for United Nations.

General discussion on the problem of iron production. (D general, Fe)

322-D. (English.) **The Rotary Kiln Processes for Sponge Iron.** Bo Kalling. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.46, 1952, 8 p. Published jointly by ECLA-TAA for United Nations.

Advantages of the Domnarfvet method of producing Fe. Diagrams, tables. (D8, Fe)

323-D. (English.) **Production of Sponge Iron According to the Wiberg-Söderfors Method.** John Stalhed. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.47, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Theory of the Wiberg process. Graphs, tables, diagrams. (D8, Fe)

324-D. (English.) **The Electric Pig Iron Furnace. Possibilities and Limitations for Its Use in the Iron and Steel Industry.** Alfonso Ballon. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.48, 1952, 17 p. Published jointly by ECLA-TAA for United Nations.

Brief description and data as a guide to the application of low-shaft electric furnace. Tables. 4 ref. (D8, CI)

325-D. (English.) **Electric Smelting of Pig Iron.** M. O. Sem. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.49, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Operation of the electric furnace. Tables. (D8, CI)

326-D. (English.) **Use of Phosphorus Ores for the Production of Pig Iron for Transforming Into Steel by the Thomas Process (Basic Bessemer).** Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.54, 1952, 4 p. Published jointly by ECLA-TAA for United Nations.

Thomas process of steel conversion. Tables. (D3, ST)

327-D. (English.) **Steel Production in Latin America.** G. Bulle. Bogota Conference, Oct. 13-Nov. 5, 1952, ST/ECLA/CONF. no. 1/L.55, 1952, 18 p. Published jointly by ECLA-TAA for United Nations.

Processes, layouts, raw materials and planning. Tables, diagrams. (D general, A4)

328-D. (English.) **Considerations Concerning the Choice of Electrical Equipment for the Iron and Steel Plants of Paz De Rio (Columbia) and Chimbote (Peru).** R. L. Jung. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.57, 1952, 15 p. Published jointly by ECLA-TAA for United Nations.

Use of electric energy as motive power for steelmaking. (D5, D6)

329-D. (English.) **Description of the Duplex Procedure Used for Manufacturing Steel in Monterrey.** Alfredo Gonzalez Ballesteros and Narciso Morales. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.59, 1952, 5 p. Published jointly by ECLA-TAA for United Nations.

Fundamental equipment and operation of the duplex method. (D7)

330-D. (English.) **Construction of a Steel Plant Intended to Cover a Part of the Requirements of a Non Steel-Producing Country.** Andre Mercier. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.61, 1952, 6 p. Published jointly by ECLA-TAA for United Nations.

Brief description of a steel plant using two blast furnaces. Tables, diagram. (D1, ST)

331-D. (English.) **Approximate Comparative Production Costs and Investment Requirements of the Standard Blast Furnace, Electric Smelting Furnace, Sponge Iron Furnace, and Tunnel Kiln Sponge Iron Furnace.** P. E. Cavanagh. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.62, 1952, 1 p. Published jointly by ECLA-TAA for United Nations.

A table comparing plant and furnace capacity, production costs and investment. (D general, A4, Fe)

332-D. (English.) **Economics of the Modern Acid Open Hearth Practice.** G. R. Fitterer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.64, 1952, 28 p. Published jointly by ECLA-TAA for United Nations.

Recent advances in technology which have added to the advantages of this process. Graphs, photograph, table. (D2, A4, ST)

333-D. (English.) **The Acid Bessemer Process.** W. O. Philbrook. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.65, 1952, 28 p. Published jointly by ECLA-TAA for United Nations.

Comprehensive account of Bessemer steel, the raw materials used and economics of the process. Tables. 26 ref. (D3, A4, ST)

334-D. (English.) **Acid Open Hearth Products and Their Specifications.** G. R. Fitterer. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no.

1/L.72, 1952, 29 p. Published jointly by ECLA-TAA for United Nations.

Advantages of process with respect to economics and steel quality. Tables, photographs. (D2, S22, A4, ST)

335-D. (English.) **Thomas Steel With Low Nitrogen and Low Phosphorus Content.** P. Coheur. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.73, 1952, 11 p. Published jointly by ECLA-TAA for United Nations.

Research undertaken to reduce N and P content of steel. Tables, graphs. (D2, ST)

336-D. (English.) **Brief Account of Iron and Steel Producing Processes Used in Brazil.** Amaro Lanari, Jr. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.74, 1952, 12 p. Published jointly by ECLA-TAA for United Nations.

Characteristics of raw materials, metallurgical methods and processes used and possible evolution of these processes. Tables. (D general, B10, Fe, ST)

337-D. (English.) **Control in Steel Production. I. The Control of Composition During Steelmaking.** G. Weston and G. R. Bolsover. **II. Standardization in Relation to Control in Steel Production.** G. Weston and R. L. Richards. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.76, 1952, 27 p. Published jointly by ECLA-TAA for United Nations.

Table. (D general, ST)

338-D. (English.) **Basic Open-Hearth Steelmaking Practice in the United States of America.** William C. Buell, Jr. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.77, 1952, 23 p. Published jointly by ECLA-TAA for United Nations.

Processing of steel in the open-hearth furnace. Tables. (D2, ST)

339-D. (English.) **Processes for the Production of Steel.** Marc Allard. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.79, 1952, 18 p. Published jointly by ECLA-TAA for United Nations.

Precautions concerning blowing in the basic converter process and rapid refining of steel through the Perrin process. Tables, graphs. 8 ref. (D3, D5, ST)

340-D. (English, Spanish.) **The Acid Bessemer Process in Huachipato (Chile.)** Hector Canguilhem. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.60, 1952, 25 p. Published jointly by ECLA-TAA for United Nations.

Main characteristics of the steel production department of the Bessemer convertor. Tables, graphs, diagrams. 12 ref. (D3, ST)

341-D. (English, Spanish.) **Foundry Iron by Recarburization of Steel Scrap.** Roberto Jaramillo, Joaquin Prieto, and Jaime Rudas. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.82, 1952, 21 p. Published jointly by ECLA-TAA for United Nations.

Recarburizing practice and additional operating details. Tables. 7 ref. (D8, Fe)

342-D. (Czechoslovakian.) **Saving of Molybdenum in Special Steels.** Rudolf Stefec. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 395-398.

Possibilities of replacing Mo in high speed, tool, structural and stainless steels. (D general, B22, Mo, SS, TS, AY)

343-D. (Czechoslovakian.) **Preparation of Open Hearth Slag Prior to Complete Melting of Charge.** Ivo Petrman. *Hutnické Listy,* v. 7, no. 11, Nov. 1952, p. 566-575.

Procedures for improving refining and degassing reactions. Tables, graphs. 3 ref. (D2, ST)

344-D. (French.) **Other Methods for the Use of Blast Furnace for Reduction of Minerals. The Low Shaft Blast Furnace.** Marc Allard. International Committee for Research on the Low Shaft Blast Furnace. 1953, 20 p.

Proposed low-shaft blast furnace and the research program of the committee. Tables. (D1, A9)

345-D. (French.) **Manufacture of Cast Steel in Electric Furnace and Tests Made in Spain. Tests in the P. Echevarria Plant.** *Journal du Four Electrique,* v. 62, no. 3, May-June 1953, p. 87-88.

Production of electric steel. Electrodes and raw materials used. (Concluded.) (D5, CI)

346-D. (French.) **Decarburization by Means of Oxygen of a Phosphorous Melt in the Open-Hearth Furnace.** G. Husson and P. Bettembourg. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 357-371.

Details of method and results obtained. Metallurgical process. Economic consideration, hourly production rate and the problem of dust in the fumes. 15 ref. (D2, A5, ST)

347-D. (German.) **Blast-Furnace Gas Purification at United Austrian Iron and Steel Works in Linz.** Alois Uxa. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 975-980.

Purification process. Graphs, diagrams, tables, photograph. 5 ref. (D1)

348-D. (German.) **Plant Experience and Economic Considerations in Blast-Furnace Operation With Increased Furnace Load.** Heinrich Kahlhöfer and Rudolf Ehrhardt. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1014-1026.

Effect of furnace load on production of blast furnaces. Change in coke consumption, dust production, temperature of waste gases, and temperature and composition of the crude iron. Tables, graphs. 13 ref. (D1, Fe)

349-D. (German.) **Cooling Open-Hearth Furnaces.** Albert Harnisch. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1026-1028.

Water-cooling installation for a 60-ton openhearth furnace. Diagrams. (D2)

350-D. (German.) **Savings in Water Effected by Cooling Installations on Open-Hearth Furnaces.** Hans Lardy. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1028-1030.

Combined cooling and steam generating installation. Economic advantages. Diagram, photographs. (D2)

351-D. (German.) **High-Pressure Steam Produced by the Heat of Waste Gases and Cooling Water of Open-Hearth Furnaces.** Kurt E. Poppe. *Stahl und Eisen,* v. 73, no. 16, July 30, 1953, p. 1030-1035.

Production of steam in waste-heat boilers and door-cooling frames and use of the steam in turbines. Tables, diagrams. (D2)

352-D. (German.) **Materials Balance and Comparison of Economic Efficiency of Various Steel-Making Processes.** Ernst Krebs and Robert Görgen. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1081-1094.

Materials balance and production costs in openhearth, bessemer and electric furnace processes. Costs compared for the three processes. Tables, graphs, diagram. 15 ref. (D2, D3, D5, A4, ST)

353-D. (German.) **Test for Determining Reducibility of Iron Ores.** Ciril Rekar. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1094-1101.

Reduction tests were made on three Yugoslav iron ores. Charcoal, CO and coke were used as reducing agents. Reduction-temperature curves plotted and compared. Photographs, graphs, diagrams, tables. 9 ref. (D general, B22, Fe)

354-D. (Hungarian.) **The Problem of Refractory Materials, With Special Respect to the Increased Application of Mazut Firing in Open-Hearth Furnaces.** Béla Selmecizi. *Kohaszati Lapok,* v. 8, no. 2, Feb. 1953, p. 25-33.

Advantages and construction details of complete basic linings. Soviet experience in the field. Graphs, table. (D2, B19)

355-D. (Italian.) **Comparison of Some Characteristics of Steels Decarburised With Oxygen and With Rolling Mill Scale.** Luciano Piana. *Metallurgia italiana,* v. 45, no. 6, June 1953, p. 212-217.

No difference in quality was observed. Tables. (D general, CN)

356-D. (Italian.) **Possibility of Extending Sanfter's Empirical Expression for the Blast Furnace to Other Ferrous Mineral Reduction Processes. Possibility of Calculating the Specific Consumption When the Furnace Charge Elements are Known.** Agostino Bargone. *Tecnica Italiana,* v. 8, no. 3, Apr.-May 1953, p. 161-164.

Table. 11 ref. (D general, Fe)

357-D. (Spanish.) **Problem of Power in Iron and Steel Works.** Gabriel Périn. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.58, 1952, 17 p. Published jointly by ECLA-TAA for United Nations.

Discussed solely in the realm of ideas. Shows how, in the majority of cases, steel works are being induced to supplement their mills with power plants. Table. (D general)

358-D. (Spanish.) **Some Data for the Construction of a Basic Bessemer Steel Plant (Paz de Rio). Approximate Cost of Producing One Ton of Bessemer Steel.** Edouard Decherf. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.63, 1952, 8 p. Published jointly by ECLA-TAA for United Nations.

Construction of Thomas steel plant. Compares production costs of steel. Tables, diagrams. (D3, A4, ST)

359-D. (Spanish.) **Possibilities of Applying Ultrasounds to the Iron and Steel Industry.** K. Bruckman. Bogota Conference, Oct. 13-Nov. 5, 1952. STT/ECLA/CONF. no. 1/L.90, 1952, 13 p. Published jointly by ECLA-TAA for United Nations.

Possibility of applying ultrasonics in the converter process. Tables. (D3, ST)

360-D. (Book—German.) **(Calculation of the Blast Furnace Burden.) Berechnung des Hochofenmöllers.** M. A. Pawlow. 148 p. 1952. Verlag Stahleisen m.b.H., Schliessfach 2590, Düsseldorf, Germany. 19 DM.

Problems of blast furnace economy. Methods for determination of the ratio of the ores, flux additions, and ash content of the fuel. (D1)

361-D. (Book—German.) **(Metallurgy of Pig Iron.) Metallurgie des Roheisens. v. I. Introduction and Charge Materials.** 194 p., v. II. **Blast Furnace Process.** 657 p., v. III. **Construction and Calculation of Blast Furnaces.** 296 p., v. IV. **Atlas Blast Furnace Constructions.** M. Pawlow. Verlag Stahleisen m.b.H., Postfach 2590, Düsseldorf, Germany. 55 DM.

Discusses raw materials for blast furnace operation from the viewpoint of the metallurgist and the blast furnace operator. Also discusses the Mn, Cr, Ni, W, V, and Ti ores. (D1, Fe)

362-D. (Book—German.) **(The Oxygen Metallurgy of the Blast Furnace Processes.) Die Sauerstoffmetallurgie der Schachtofenprozesse.** Heinrich Koppenberg and Werner Wenzel. 237 p.

1953. Verlag Stahleisen m.b.H., Schliessfach 2590, Düsseldorf, Germany. 18 DM.

Development of metallurgical engineering. Pyrometric principles of O_2 utilization. theoretical and practical discussion of O_2 utilization in blast furnace processes.
(D1, B22, Fe)

E

Foundry

500-E. Turbine Starter. *Aircraft Production,* v. 15, Aug. 1953, p. 302-308.

Gravity die casting of turbine starter. Photographs, diagrams. (E13)

501-E. Construction and Operation of Coal-Fired Air Furnaces. Cecil F. Semrau. *American Foundryman,* v. 24, Aug. 1953, p. 34-39.

Diagrams. (E10)

502-E. It Costs More Than You Think. Harold Brown. *American Foundryman,* v. 24, Aug. 1953, p. 40, 42.

Cost of casting from receipt through ultimate use in the field. Photographs. (E general)

503-E. Steel Casting Design—A Story in Pictures. *American Foundryman,* v. 24, Aug. 1953, p. 48-51.

Example of development of compressor crankshaft casting. Diagrams, photographs. (D general, CI)

504-E. Understanding Melt Quality. J. G. Kura. *American Foundryman,* v. 24, Aug. 1953, p. 56-63.

Melt quality and effect of mold materials on molten metal. Simplified outline of the theory of gases in Cu-base alloys. Radiographs, photomicrographs and graphs. 7 ref. (E25, N16, Cu)

505-E. The Future of Zinc in Die Castings. W. J. During. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 109-116.

Design, functional and economic relationships. (E13, Zn)

506-E. The Use of Calcium Carbide in Cupola Melting. Sam F. Carter and Ralph Carlson. *Canadian Metals,* v. 16, Aug. 1953. p. 30, 32.

Study of effects of CaC_2 on limitations in cupola melting. Tables. (E10, CI)

507-E. On High-Temperature Melting and Pouring of Gray Iron Castings. I. Ichiro Iitaka and Kazuhiko Sekiguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 1-3.

Melting and pouring at various temperatures and the effect on hardness. Graphs. (E10, E23, Q29, CI)

508-E. Research on the Flow-Dynamics of Molten Metals. III. Kiyoshi Yokota and Eisuke Sato. *Castings Research Laboratory, Report,* no. 4, 1953, p. 7-9.

Diagrams, graphs. (E25, P12, Hg)

509-E. Relation Between Melting Condition and Casting Defects in Iron Castings. III. Nobutaro Kayama. *Castings Research Laboratory, Report,* no. 4, 1953, p. 10-12.

Graphs. (E general, CI)

510-E. Research on Die-Casting Process. I. Size of Gate. II. Length of Die Casting. Nobutaro Kayama and Masakazu Ichida. *Castings Research Laboratory, Report,* no. 4, 1953, p. 13-16.

Studies on effects of dimensional variations on the quality of castings. Diagrams, graphs. (E13)

511-E. Spheroidal Graphite Cast Iron. II. Especially as to the Effects of the Addition of Metallic Calcium and Calcium Silicide on Gray Cast Iron. Takaji Kusakawa. *Castings Research Laboratory, Report,* no. 4, 1953, p. 20-22.

Possibility of reducing amount of $CaSi_2$ by adding it to the flux with CaF_2, KCl, or $NaBO_2$. Graphs, table. (E25, CI)

512-E. Blow Holes Occurring in the Fusion Zone Between Molten Cast Iron and Solid Steel. Tsunemitsu Muraki. *Castings Research Laboratory, Report,* no. 4, 1953, p. 30-32.

Experiment to show causes of blow holes. Tables, diagram, graph. (E25, CI)

513-E. Binding Strength Measurement of Green Sand Moulds. I. Jiro Kashima. *Castings Research Laboratory, Report,* no. 4, 1953, p. 36-38.

Determined by the penetrometer method. Graphs. (E18)

514-E. Molding Sand Binders. Toshisada Makiguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 39-42.

Advantages of dehydration by heating in a slight vacuum. Graphs, table. (E18)

515-E. Binding Property of Molding Sand. Jiro Kashima and Mototaka Mutaguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 43-45.

Determination of clay content by polarography method. Diagram, graphs. (E18)

516-E. Aluminum Casting Alloys. Vernon Swan. *Electrical Manufacturing,* v. 52, Aug. 1953, p. 97-103.

Composition, foundry considerations and properties of light-weight alloys suitable for sand, permanent mold or pressure die casting. Effect of application requirements on casting method. Tables.
(E11, E12, E13, Al)

517-E. Effect of Heat on Clays and Its Bearing on the "Life" of Clay Bonds. S. Davidson and J. White. *Foundry Trade Journal,* v. 95, Aug. 6, 1953, p. 165-174.

Paper presented to the 50th annual meeting of the Institute of British Foundrymen at Blackpool. Describes bentonite clays, hydrous clay micas and montmorillonites. Swelling properties, effects of interlayer cations and loss of constitutional water. Thermal-analysis curves. Tables, graphs. 33 ref. (To be continued.) (E18)

518-E. Auto-Slagging Twin Tuyeres. *Foundry Trade Journal,* v. 95, Aug. 6, 1953, p. 175-178.

Slightly abridged from anonymous article in *Fonderie.* Recent French advances. Diagrams. (E10)

519-E. Cold Chamber Machine Adds Flexibility, Economy. C. H. Drewes. *Iron Age,* v. 172, Aug. 27, 1953, p. 112-114.

Die casting of Al, Cu, and Zn alloys. Photographs. (E13, Al, Cu, Zn)

520-E. Shell Moulding. New British Automatic Machine. *Iron and Steel,* v. 26, Aug. 1953, p. 393-394.

Describes and illustrates equipment. (E16)

521-E. Gravity Die Casting Foundry Extended. *Machinery (London),* v. 83, Aug. 14, 1953, p. 319-322.

Dies used at one foundry. Photographs. (E13, Cu)

522-E. Dimensional Tolerances for Steel Castings. Charles W. Briggs. *Mechanical Engineering,* v. 75, Aug. 1953, p. 619-621.

Paper presented at the Fall Meeting of the ASME, Chicago, Sept. 7-11, 1952. Condensed. Specifications, pattern tolerances, castability and casting dimensional tolerances. Tables. (E general, S14, CI, AY)

523-E. Tolerances and Specifications of Malleable Castings. James H. Lansing. *Mechanical Engineering,* v. 75, Aug. 1953, p. 621-624.

Paper presented at the Fall Meeting of the ASME, Chicago, Sept. 7-11, 1952. Condensed. Tables, photographs. (E general, S14, CI)

524-E. Die-Castings in the Olivetti Lettera 22. *Metal Industry,* v. 83, July 24, 1953, p. 67-69.

Pressure die casting of portable typewriter parts. Photographs. (E13, Al)

525-E. Founding Magnesium-Zirconium Alloys. H. J. Millward. *Metal Industry,* v. 83, July 31, 1953, p. 83-85.

Composition and properties of the alloys for aircraft castings. Photographs.
(E general, Q general, T24, Mg, Zr)

526-E. Porosity in "Y" Alloy Pistons. *Metal Industry,* v. 83, Aug. 1953, p. 130.

Detection of flaws and how to correct them. (E25, S13, Al)

527-E. Brass Pressure Die-Castings. *Metal Industry,* v. 83, Aug. 21, 1953, p. 145.

Difficulties associated with die casting alloys whose melting point is considerably higher than that of conventional die casting alloys. Photographs. (E13, Cu)

528-E. The Melting of Chill-Cast Tin Bronzes. *Metal Progress,* v. 64, July 1953, p. 180, 182, 184, 186.

Condensed from Chapters 4 and 5, "The Melting Process", of the book "Chill-Cast Tin Bronzes", by D. Hanson and W. T. Pell-Walpole, published by Edward Arnold & Co., London, England. Satisfactory melting procedure. (E10, Cu)

529-E. A Rapid Method of Dust Estimation in Iron and Steel Foundries. W. B. Lawrie. Paper from "Dust in Industry." Society of Chemical Industry, London, p. 9-12; disc., p. 12-14.

Method using visual estimation of photomicrographs against a standard scale. Photomicrographs, photographs. (E general, A5)

530-E. Precision Casting With Green Sand. *American Foundryman,* v. 24, Sept. 1953, p. 34-38.

Process and equipment. Photographs. (E11)

531-E. Evaluating Moulding Methods. *American Foundryman,* v. 24, Sept. 1953, p. 48-52.

Consists of "What Is Precision Casting?", Hiram Brown; "Green Sand Is Versatile", C. E. Maddick; and "Dry Sand for Heavy Work", George W. Anselman. Photographs. (E11)

532-E. Let's Look at High-Pressure Molding. R. W. Heine and T. E. Barlow. *American Foundryman,* v. 24, Sept. 1953, p. 54-56.

Process, properties of the sand and advantages. Graphs, photographs. (E19)

533-E. Evaluating Molding Methods. II. The Place of Shell Molding. J. B. Stazinski. **Molding in Core Sand.** George P. Antonic. **Casting in Metal Molds.** William B. Scott. *American Foundryman,* v. 24, Oct. 1953, p. 42-46.

Technical and economical advantages of shell, permanent and core molds. (E16, E12, E19)

534-E. Use and Abuse of Crucibles. R. H. Stone. *American Foundryman,* v. 24, Sept. 1953, p. 57-61.

Care and use of crucibles in foundries. Photographs. (E10)

535-E. The Use of Calcium Carbide in Cupola Melting. II. *Canadian Metals,* v. 16, Sept. 1953, p. 28, 32.

Effects of CaC_2 on some limitations recognized as existing in cupola melting. Tables. 4 ref. (E10)

536-E. Foundry Practice. William H. Salmon and Eric Simons. *Edgar Allen News,* v. 32, Sept. 1953, p. 203-204.

Preparation of patterns and 3-part

stacked molds. Diagrams. (To be continued.) (E17, E19)

537-E. Economic Utilization of Copper-Base Alloys. *Engineering,* v. 176, Aug. 14, 1953, p. 222-224.
Foundry procedures. (E general, Cu)

538-E. The Shell Moulding Process. I. D. N. Buttrey. *Engineering,* v. 176, Aug. 21, 1953, p. 251-252.
Abridged from paper presented during the 50th Annual Conference of the Institute of British Foundrymen, Blackpool, June 16-19, 1953. Characteristics and basic operation of the process. (To be continued.) (E16)

539-E. The Shell Moulding Process. II. D. N. Buttrey. *Engineering,* v. 176, Aug. 28, 1953, p. 285.
Methods for producing sand shell molds. (Concluded.) (E16)

540-E. A Special Report on European Foundry Progress. *Foundry,* v. 81, Sept. 1953, p. 102-117.
Foundry experts in Great Britain, France, Belgium, Italy, Netherlands, Germany and Switzerland outline activities and significant current developments in the foundry industry. Photographs. (E general)

541-E. Plastic Patterns Offer Advantages in Investment Casting. Roland S. Banister, *Foundry,* v. 81, Sept. 1953, p. 120-123.
Shows that plastic patterns can be made economically, eliminate hand work, decrease the number of patterns lost during dip coat and investing operations and give excellent as-cast finishes. Photographs. (E15)

542-E. Stress Relief of Gray Iron. Charles O. Burgess. *Foundry,* v. 81, Aug. 1953, p. 112-114; Sept. 1953, p. 128-131, 302-304.
Causes and ill effects resulting from internal stresses. Effect of temperature, holding time and cooling rate. Diagrams, graphs, photographs. 19 ref. (E general, J1, CI)

543-E. What is a Good Pattern? Walter Siebert. *Foundry,* v. 81, Sept. 1953, p. 132-133.
Construction of a large, complex pattern requires patternmaking skill and designer's co-operation. Photographs. (E17)

544-E. Formulas for Determining Weights of Castings. *Foundry,* v. 81, Sept. 1953, p. 265.
Data sheet. Diagrams. (E general)

545-E. Drops Cupola Bottom Once a Week. Edwin Bremer. *Foundry,* v. 81, Sept. 1953, p. 124-125, 298, 300-301.
Practice in small foundry and advantages that have resulted. Diagrams. (E10)

546-E. Difficulties in the Production of Centrifugally-Cast Nickel-Bronze Bearing Shells. J. Taylor, Z. Stokowiec and R. S. Jackson. *Foundry Trade Journal,* v. 95, Aug. 27, 1953, p. 253-260.
Mechanism of bubble formation, gas porosity, location of defective metal, and changes in solidification process. Tables, graphs, micrographs. (E14, E25, Cu, Ni)

547-E. "Foundry" Development in the Textile Industry. B. Gale. *Foundry Trade Journal,* v. 95, Aug. 27, 1953, p. 265-273.
Foundry layout and procedure for casting parts for textile machinery. Photographs, diagram. (Concluded.) (E general, CI)

548-E. Part Needs Determine Best Casting Method. Davidlee Von Ludwig. *Iron Age,* v. 172, Sept. 3, 1953, p. 128-132.
Properties of parts affecting use of casting methods. Photographs. (E general)

549-E. Backyard Core Foundry Solves Binder Problems. Harold E. Bourassa. *Light Metal Age,* v. 11, Aug. 1953, p. 8-9, 35.
Use of urea-formaldehyde resins as foundry-core binders. Photographs. (E18)

550-E. Crucible Melting of Aluminium. *Light Metals,* v. 16, Sept. 1953, p. 306-307.
Melting procedure, factors affecting life of crucibles and flux attack. Photograph. (E10, Al)

551-E. Works Layout for Increased Productivity. *Machinery (London),* v. 83, Aug. 28, 1953, p. 439-448.
Die casting plant layout and operations. Diagram, photographs. (E13, Zn, Al)

552-E. A New "Lost-Wax" Precision Casting Foundry. *Machinery (London),* v. 83, Sept. 11, 1953, p. 507-514.
Equipment and procedures employed. Photographs. (E15)

553-E. Modern Aluminium and Stainless Steel Foundry. *Mechanical Handling,* v. 40, Sept. 1953, p. 416-418.
Flow layout, nonferrous machine molding section and the sand plant. Diagram, photographs. (E18, E19, Al, SS)

554-E. Metal Casting Methods. V. Non-Ferrous Ingots. J. B. McIntyre. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 63-67.
Casting of nonferrous ingots, with particular reference to Cu-base alloys cast in chill molds. Photographs. 12 ref. (E16, Cu)

555-E. Productivity of Die-Casting Industry. *Metal Progress,* v. 64, Sept. 1953, p. 138, 140.
Digest of "Productivity Report", *Engineer,* Oct. 31, 1952, p. 569. Techniques, output, and labor relations in American and British industries. (E13)

556-E. Cast Furnace Resistors. *Metal Progress,* v. 64, Sept. 1953, p. 166, 168, 170.
Translated and condensed from "Heating Elements for Electric Resistance Furnaces Cast From Inoculated Alloys" (Russian), N. S. Kreshtshanovsky and A. D. Sventshansky, *Foundry Production,* 1952, no. 4, p. 6-11. Melting and alloying processes; use of various additions. (E10, B22, Cr, Ni)

557-E. British Views of Shell Molding. *Metal Progress,* v. 64, Aug. 1953, p. 188, 190, 192.
Digest of "Discussion on Shell Molding", by J. G. Pearce and W. B. Parkes, Research Report No. 347, *Journal of Research and Development.* See item 52-E, 1953. (E16)

558-E. The American Die Casting Industry. *Modern Metals,* v. 9, Sept. 1953, p. 62, 64, 66-68.
British report on American methods discusses finishing and inspection of Zn-alloy die castings. Reviews current research on die casting in U. S. Graphs. (E13, Zn)

559-E. Improved Die Coatings and Lubricants for Die Casting Brass and Other High Melting Alloys. *Precision Metal Molding,* v. 11, Sept. 1953, p. 52, 95-96.
Measures to prevent die checking. (E13)

560-E. Properties and Uses of Die Castings in the Low Melting Alloys. W. W. Richmond. *Precision Metal Molding,* v. 11, Sept. 1953, p. 58-59, 101-103.
Advantages and uses of Pb and Sn alloys. Tables, photographs. (E13, Pb, Sn)

561-E. Three Reasons to Use Investment Cast Parts. Wm. Bangser. *Precision Metal Molding,* v. 11, Sept. 1953, p. 67-68.
Factors favoring investment casting. Photographs. (E15, CI)

562-E. Comparison of Impregnants for Aluminum and Magnesium Castings. Carl F. Olson. *Precision Metal Molding,* v. 11, Sept. 1953, p. 114-121.
Advantages and properties of major sealants. Table, photographs. (E25, Al, Mg)

563-E. Shell Molding of Stainless Steel. Walter H. Dunn and Robert E. Day. *Product Engineering,* v. 24, Sept. 1953, p. 129-133.
Advantages, limitations and capabilities of process. Photographs, table, graph. (E16, SS)

564-E. Thin Walls Provide Strength for Magnesium Castings. Clarence H. Butler. *Western Metals,* v. 11, Aug. 1953, p. 56-58.
Casting design. Photographs, diagrams. (E17, Mg)

565-E. (Czechoslovakian.) **Chemical Hardening Molding Mixtures.** L. Petrzela. *Hutnické Listy,* v. 7, no. 10, Oct. 1952, p. 514-518; no. 11, Nov. 1952, p. 575-585.
Sand additives which harden quickly under effect of CO_2. (E18)

566-E. (Czechoslovakian.) **Malleable Iron.** P. Rys. *Hutnické Listy,* v. 7, no. 10, Oct. 1952, p. 519-522; no. 11, Nov. 1952, p. 585-588.
Production methods in USSR, U.S.A., England and Italy. Discusses heat treatment. Graphs. 13 ref. (E11, J23, CI)

567-E. (Dutch.) **The Effect of Foundry Sand Upon the Percentage of Defective Castings in the Foundry.** A. Schaer. *Metalen,* v. 8, no. 10, May 30, 1953, p. 216-218.
Types of defects caused by various sands. Suggestions for avoiding defects. (E18)

568-E. (Dutch.) **Centrifugal Casting in the Choice of the Correct Type of Bronze for a Particular Purpose.** *Metalen,* v. 8, no. 10, May 30, 1953, p. 219-222.
History of development for Pb bronze bearing metal. Special properties of centrifugally cast bronze. Micrographs. (E14, Cu, Pb)

569-E. (French.) **Production of Copper Castings With Metallic Inserts.** *Fonderie,* 1953, July, no. 90, p. 3520-3522.
Prevention of various defects. Diagram. (E general, Cu)

570-E. (French.) **Gas and Inherent Blowholes in the Foundry.** Albert Portevin. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 445-464.
Metallurgical problems in ingots and castings. Tables, graphs, diagrams. (E25, Fe, Al, Cu, Si)

571-E. (German.) **Crucible Casting Process.** A. Beck and K. E. Mann. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 310-314.
Development, theory, technology and possibilities of improving the process. Photographs, diagram. 2 ref. (E10)

572-E. (German.) **Testing of Core-Sand Mixtures.** H. Derlon, and C. Rauh. *Giesserei,* v. 40, no. 16, Aug. 6, 1953, p. 404-409.
Water and binder contents, drying temperature, cooling time and natural variations in sand. Graphs. 18 ref. (E18)

573-E. (German.) **New Foundry Practices.** A. Obermüller. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 618-619.
Chill-cast molding (Croning Process) and chill casting in Al molds. (E16, Al)

574-E. (Hungarian.) **Hungarian Bentonites as Foundry Binding Agents.** Janos Barna. *Öntöde,* v. 4, no. 2, Feb. 1953, p. 30-39.
History of rich Hungarian bentonite deposits. Composition and properties with special consideration of binding capacity in the crude state after heat treatment and at elevated temperatures. Tables, graphs. 21 ref. (E18)

575-E. (Hungarian.) **Production of Spheroid Graphite Cast Iron.** Istvan Karsay. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 25-30.

Possibilities for application of spheroid graphite cast iron and an implement for its handling, developed at the Hungarian Research Institute of the Iron Industry. Diagrams, micrographs, graphs. 11 ref. (E25, T general, CI)

576-E. (Hungarian.) **Casting of Iron Cylinders Using Metal From the Reverberatory Furnace.** Aladar Schleicher. *Ontöde,* v. 4, no. 2, Feb. 1953, p. 45-48.

Difference in microscopic structure of Hungarian and foreign irons. Conditions necessary for the production of high-quality cylinders. 11 ref. (E general, Fe)

577-E. (Portuguese.) **Aluminum Alloys. The Technique of Sand Casting.** Clovis Bradaschia. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 47-72.

Effects of the most common alloying elements, properties of the alloys, processes in the electric furnace, sand casting, thermal treatment, and prevention of defects. Tables, photographs. 15 ref. (E11, Al)

578-E. (Portuguese.) **Clays and Bentonites in Casting.** Carlos Dias Brosch. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 73-108.

Use in the foundry. Tables, graphs. 3 ref. (E18)

579-E. (Swedish.) **Materials Handling in the Foundry.** G. Lindgren. *Gjuteriet,* v. 43, no. 7, July 1953, p. 119-125.

Economic aspects of foundry operation. Influence of planning on operational costs. Diagrams, tables. 3 ref. (E general, A5)

580-E. (German.) **Reaction of Solid Iron With Melts of Zinc Containing Aluminum Alloys.** K. Schneider and H. Kessler. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 608-610.

Formation of FeAl layer in composite castings. Photographs. 8 ref. (E25, Al, CI, CN, ZN)

581-E. Copper Oxides—Useful Tool in Casting Copper-Base Alloys. L. G. Klinker. *Foundry,* v. 81, Sept. 1953, p. 228, 230, 236.

Use of commercial copper oxide materials to control porosity. (E25, B22, Cu)

582-E. (Book.) **Advanced Casting Techniques and Processes. Summary and Final Report by Alloy Engineering and Casting Company for the Department of the Navy.** PB no. 109239. May 1950. 147 p. (Available from Library of Congress, Washington 25, D. C. Microfilm, $5.75. Photostat, $18.75.)

Reports work in casting of high-temperature alloys in ceramic molds. Explains and illustrates special equipment. (E12, EG-h)

F

Primary Mechanical Working

227-F. Design Problems of Large Aluminum Forgings. C. W. Andrews. *Automotive Industries,* v. 109, Aug. 15, 1953, p. 32-33.

Cost factors to be considered when planning types of operations. (F22, Al)

228-F. New Hot Strip Mill at Pittsburgh Steel. J. C. Peth and F. E. Fairman, III. *Blast Furnace and Steel Plant,* v. 41, Aug. 1953, p. 926-938, 944.

Layout of semicontinuous hot strip mill. Diagrams, tables, graphs, photographs. (F23)

229-F. The Manufacture and Manipulation of Seamless Tubes. Accles and Pollock. *Engineering,* v. 176, Aug. 7, 1953, p. 161-165, 176.

Drawing process in detail. Photographs. (F26, CN, AY, SS)

230-F. New Mill Helps Boost Rod Output. John Delaney. *Iron Age,* v. 172, Aug. 27, 1953, p. 109-111.

Diamond and square rolling in roughing stands. Diagram, photograph. (F23, ST)

231-F. Replacements for Palm Oil in Cold Rolling Steel. Robert C. Williams. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 65-66; disc., p. 66-68.

Investigation for a substitute for palm oil. (F1, F23, ST)

232-F. Production of Aluminum Foil. W. B. Hackett. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 91-94.

Rolling mills and uses for Al foil. Photographs, diagrams, tables. (F23, T general, Al)

233-F. Pittsburgh Steel Starts New 66-In. Hot Strip Mill. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 118-120, 122, 124.

Describes and illustrates equipment. (F23)

234-F. Extrusion: The Newest Metal Working Method in Industry. T. F. McCormick. *Steel Processing,* v. 39, Aug. 1953, p. 379-382.

Process and equipment. Photograph, diagrams. (F24)

235-F. Performance of Ingot Heating Furnaces. S. A. Limpach and J. A. Reed. *Steel Processing,* v. 39, Aug. 1953, p. 392-398.

Report on typical performance of box-type ingot heating forge furnaces. Photographs, tables. (F21, ST)

236-F. The Extrusion of Brass Rod and Section. D. J. Broadley. *Australasian Engineer,* 1953, July, p. 67-73.

Development of equipment and technology. Production and preparation of billets. Diagrams, photographs. (F24, Cu)

237-F. Alcoa Gets Set for Big Forge Presses. *Aviation Week,* v. 59, Sept. 14, 1953, p. 28-30, 32, 35-36, 39.

Operating experiences with high-pressure forge machines. Photographs. (F22)

238-F. Rolls and Rolling. XXXV. Rails. E. E. Brayshaw. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1040-1047.

Design and production of groove rails. Diagrams, table. (F23)

239-F. Pittsburgh Steel Begins Hot Strip Mill Operation. *Blast Furnace and Steel Plant,* v. 41, Sept. 1953, p. 1053-1056.

Sixty-six inch semicontinuous hot strip mill, pickling line and finishing operations. Photographs. (F23)

240-F. The Temper Mill Drives at the Trostre Tinplate Works. *Engineer,* v. 196, Aug. 28, 1953, p. 265-268.

Cascade control exciter system, applied in conjunction with Ward-Leonard control for maintaining correct strip tension. (F23)

241-F. The Manufacture and Manipulation of Seamless Tubes. III. *Engineering,* v. 176, Aug. 21, 1953, p. 225-227.

Types of tubes made and the drawing process. Photographs. (F26)

242-F. Forging Techniques for Light Alloys. A. E. Favre. *Light Metal Age,* v. 11, Aug. 1953, p. 12-14.

Dimensional uniformity, pressure control, thin webs, deflection, draft angles, stock control, forgeability, design and machining. Diagrams, graph, photograph. (F22, Al, Mg)

243-F. Producing Precision Forgings on a deRoll Semi-Automatic Machine. *Machinery* (London), v. 83, Aug. 21, 1953, p. 339-346.

Constructional features of a semi-automatic precision hot forging machine. Photographs, diagrams. (F22)

244-F. Cold Extrusion of Steel. *Machinery* (London), v. 83, Sept. 18, 1953, p. 572-576.

Factors influencing process. Developments in process. Tables, graphs, diagrams. 6 ref. (F24, CN, AY)

245-F. Light-Alloy Forging. Design and Production Problems as Related to Heavy-Press Operations. A. E. Favre. *Mechanical Engineering,* v. 75, Sept. 1953, p. 693-697, 718.

General forging considerations, deflection studies, reducing unit pressures, design proportions, tolerances, die sinking, machining, residual stresses and distortion. Graphs, tables, diagrams. (F22, EG)

246-F. Panel Extrusions in Aircraft Structures. Howard Kastan. *Mechanical Engineering,* v. 75, Sept. 1953, p. 715-718.

Design and production development of tailored integrally stiffened sheet, stiffeners and skin made in one piece. Diagrams. 8 ref. (F24)

247-F. Cold Shaping of Steel by Compression Reaches Commercial Applications. Arthur H. Allen. *Metal Progress,* v. 64, Aug. 1953, p. 65-68.

Cold extrusion process and use for mass production of various shapes at Mullins Mfg. Corp. Photographs. (F24, CN)

248-F. Factors Influencing Cold Extrusion of Steel. H. J. Pessl, and H. H. Hauttmann. *Metal Progress,* v. 64, Aug. 1953, p. 69-73.

Bars were extruded from 25 carbon and low-alloy steels and tests made to determine effect of die angle and reduction of area. Mechanical properties of the bars were determined. Tables, photographs, graphs. (F24, Q general, ST)

249-F. Tools, Lubricants and Steels for Cold Extrusion. Tom Bishop. *Metal Progress,* v. 64, Aug. 1953, p. 74-77.

Characteristics and properties of die steels. Tools and lubricants. Tables, graphs. (F24, T5, AY)

250-F. Effect of Boron on the Overheating Temperature of Steel. J. Field. *Metal Progress,* v. 64, Aug. 1953, p. 78-83.

Tests compare the effect of two boron ferro-alloys on heating for hot work. Graph, tables, photographs. 7 ref. (F21, ST)

251-F. Cold Extrusion of Steel. William J. Meinel. *Ordnance,* v. 38, Sept.-Oct. 1953, p. 244-247.

Advances in techniques and applications to forming projectiles. Photographs. (F24, CN)

252-F. New Surface Treatment Method Facilitates the Cold Working of Stainless & Heat-Resistant Alloys. H. A. Holden. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 775-778, 819.

Various coatings used to assist in stainless steel tube and wire drawing. Table, photograph. (F1, F26, F28, SS)

253-F. Oxygen Cut-Offs in the Hot Mill. R. L. Deily. *Steel,* v. 133, Oct. 5, 1953, p. 98, 100.

Equipment and advantages of process. Photographs, diagram. (F29, ST)

254-F. Induction Forging Can Be Versatile. Frank T. Chesnut. *Steel,* v. 133, Sept. 7, 1953, p. 112-113.

Plant layout and operational procedure. Diagram, photographs. (F22, ST)

255-F. (German.) **Rolling of Semifinished Product in Limited Steel Ingot**

Production and Scheduling of Rolled Products. Walter Kruse. *Stahl und Eisen*, v. 73, no. 17, Aug. 13, 1953, p. 1101-1107.

Proportion of semifinished products in relation to total production of steel ingots in Germany. American and German rolling mills are compared relative to market conditions and rolling schedules. Graphs, diagrams, tables. 4 ref. (F23, ST)

256-F. (German-French.) **Flame Straightening of Work Pieces.** Richard Pfeiffer. *Zeitschrift für Schweisstechnik*, v. 43, no. 6, June 1953, p. 106-109.

Methods, tools, tests and relations between heat, stresses and deformation. (To be continued.) (F29)

G

Secondary Mechanical Working

301-G. Hydroforming. *Aircraft Production*, v. 15, Aug. 1953, p. 287-290.

High-pressure flexible die process. Diagrams, photographs. (G8)

302-G. Spar-Boom Bending. *Aircraft Production*, v. 15, Aug. 1953, p. 294-299.

New machine for controlled hot or cold forming of large extruded sections. (G6)

303-G. Metal-Cutting Chatter and Its Elimination. R. S. Hahn. *ASME, Transactions*, v. 75, Aug. 1953, p. 1073-1078; disc., p. 1078-1080.

Primary chatter, transitional instability and feedback effect. Photographs, diagrams, graphs. 6 ref. (G17)

304-G. Drawing Force Through Die. Circular Arc Type Die. Hiroshi Yamanouchi and Ikuhiko Hayashi. *Castings Research Laboratory, Report*, no. 4, 1953, p. 46-47.

Comparison of drawing forces through circular arc and straight line type dies. (G4, CN)

305-G. On Impact Extrusion. Yuji Matsuura. *Castings Research Laboratory, Report*, no. 4, 1953, p. 48-49.

Experiment using inverse type of impact extruding. Graphs, diagram, photograph. (G5)

306-G. Three-Dimensional Flame Cutting. *Industry & Welding*, v. 26, Sept. 1953, p. 36-38, 76.

Procedure and apparatus. Photographs. (G22)

307-G. Forming, Cutting and Welding Procedures for Manufacture of 22"-42" O.D. Pipe. *Industry & Welding*, v. 26, Sept. 1953, p. 58-60, 62-63.

Photographs. (G general, K general, ST)

308-G. Carbon Arc-Air Torch Speeds Removal of 1500 Fillet Welds. *Industry & Welding*, v. 26, Sept. 1953, p. 87-88.

Use of new Arcair cutting and gouging torch. (G22, K1)

309-G. Gun Barrels Deburred and Cleaned by Liquid Honing. W. G. Patton. *Iron Age*, v. 172, Aug. 27, 1953, p. 102-103.

Photographs. (G19)

310-G. How to Prevent Distortion of Pierced Holes During Forming. Frederico Strasser. *Iron Age*, v. 172, Aug. 20, 1953, p. 134-135.

Diagrams. (G general)

311-G. The Hot Pressing of Metals. H. K. Barton. *Machinery (London)*, v. 83, Aug. 7, 1953, p. 263-268.

Types of presses and dies. Diagrams. (G1, F22)

312-G. The Spark Erosion of Hard Metals. *Machinery Lloyd (Overseas Ed.)*, v. 25, Aug. 1953, p. 97-98.

Apparatus to machine hard metals. Photograph. (G17)

313-G. Press Trimming Large Diecastings. H. K. Barton. *Mechanical World and Engineering Record*, v. 133, Aug. 1953, p. 348-349.

Construction of presses and dies. Diagrams. (G15)

314-G. Early Experiments in the Cold Extrusion of Steel. H. J. Pessl and H. H. Hauttmann. *Metal Progress*, v. 64, July 1953, p. 97-102.

History of cold extrusion. Pressure requirements, effect of lubricants and use of phosphate coatings. (G5, ST)

315-G. Tool Wear vs. Metal-Cutting Temperatures. A. O. Schmidt. *Metal Progress*, v. 64, July 1953, p. 186, 188.

Previously abstracted from *Tool Engineer*. See item 369-G, 1952. (G17, S16, CN, Mg)

316-G. Recommended Procedures for Grinding Titanium Alloys. *Metal-Working*, v. 9, Sept. 1953, p. 16-19.

Extract from "Grinding Recommendation for Titanium", a technical bulletin issued by Norton Co. Types of wear, grinding ratio, grinding fluids and quality production. Tables. (G18, Ti)

317-G. A Guide for Selecting the Proper Cutting Fluids. *Metal-Working*, v. 9, Sept. 1953, p. 20-21.

Extract from "Fluids and Facts for Metal-Working", a manual issued by the Standard Oil Co. of Indiana. Includes table. (G21)

318-G. Dimples Make the Difference in Aluminum Heat Exchangers. *Modern Metals*, v. 9, Aug. 1953, p. 44, 46, 50.

Process to increase heat transfer efficiency. Photographs. (G2, Al)

319-G. An Investigation on Peening. P. L. Calamari, F. J. Crum, and G. W. Place. *Welding Journal*, v. 32, Aug. 1953, p. 387s-402s.

Presented at Thirty-Third National Fall Meeting, AWS, week of Oct. 19, 1952, Philadelphia, Pa. Evaluates effects of peening. Results of modified Charpy impact test and hardness surveys. Graphs, tables, photographs, micrographs. 2 ref. (G23, Q6, Q29, CN)

320-G. Forming Tool Can Exert 4800-Ton Force. William P. Brotherton. *Western Machinery and Steel World*, Aug. 1953, p. 92-94.

Radial expanding tool for fabricating Al and stainless steel sheet metal parts for jet engines. Photographs. (G9, Al, SS)

321-G. Diamonds in Industry. *Western Machinery and Steel World*, v. 44, July 1953, p. 81-82; Aug. 1953, p. 96-97.

Use of diamonds as abrasives. Photographs. (G18)

322-G. Machinability of Cast Iron. W. H. Moore. *Western Machinery and Steel World*, v. 44, Aug. 1953, p. 99-105.

Controlled microstructure, variations in castings, test for S, even O_2 distribution, graphite disposition and control of constitution. Micrographs, photographs. (G17, CI)

323-G. Spin-Dimpling. *Aircraft Production*, v. 15, Sept. 1953, p. 314-317.

Spin-dimpling process and equipment. Diagrams, photographs. (G2)

324-G. Practical Approach to Optimum Machining. I. Chip Studies Reveal What Happens During Turning. II. Forces and Vibration on the Tool Affect Its Life. III. Chip-Tool Temperature Affects the Cutting Speed. A. B. Albrecht. *American Machinist*, v. 97, May 25, 1953, p. 121-125; June 8, 1953, p. 142-145; June 22, 1953, p. 130-133.

Micrographs and photographs. (G17, TS)

325-G. Machinability of High-Phosphorus Irons Improved by Ladle Additions. Edward A. Loria. *American Machinist*, v. 97, Aug. 31, 1953, p. 92-95.

How effects of additives on microstructures permits high phosphorus irons to be machined. (G17, Fe)

326-G. Cope Talks on Draw Dies. V. Layout of Deep-Drawn Shells Follows Certain Steps. Stanley R. Cope. *American Machinist*, v. 97, Sept. 14, 1953, p. 126-129.

Deep drawing of metal shells. Diagrams. (G4)

327-G. Be Cagey With Titanium. John A. Boyd. *American Machinist*, v. 97, Sept. 14, 1953, p. 129.

Importance of proper machining methods. (G17, Ti)

328-G. Mist Cooling. Ben C. Brosheer. *American Machinist*, v. 97, Sept. 14, 1953, p. 137-152.

Applications of spray cooling during machining. Coolants, theory and case studies on various machines. Tables, photographs. (G21)

329-G. Cope Talks on Draw Dies. IV. Shallow Shells Require Careful Die Design. Stanley R. Cope. *American Machinist*, v. 97, Sept. 14, 1953, p. 164-166.

Action of dies in blanking and drawing medium and large shells. Diagrams. (To be continued.) (G4)

330-G. How to Grind Carbides Six Times as Fast With Less Than 1% Diamond Wheel Wear. John A. Mueller. *American Machinist*, v. 97, Sept. 28, 1953, p. 122-125.

Electrolytically assisted grinding of cemented carbides. Diagrams, table, photographs. (G18, SG-j)

331-G. Cutting Abrasive Costs in Body Plant. J. R. O'Neil and W. J. Swallow. *Automotive Industries*, v. 109, Sept. 1, 1953, p. 66-68, 100, 102, 104.

Abrasive techniques and equipment which provide maximum efficiency at lowest cost. Photographs. (G18)

332-G. Forming Exhaust Pipes With Timesaving Equipment. *Automotive Industries*, v. 109, Sept. 1, 1953, p. 72, 110, 112.

New 20-ton vertical hydraulic bending press used to produce exhaust and tail pipe bends at a production rate 50% faster than that achieved with former equipment. Photographs, table. (G6)

333-G. The Manufacture and Manipulation of Seamless Tubes. II. Accles and Pollock. *Engineering*, v. 176, Aug. 14, 1953, p. 193-195.

Machining of the tubes, equipment used and uses of the tubes. Photographs. (G17, F26)

334-G. Factors to Consider When Purchasing Double-Action Presses. Gordon M. Sommer. *Finish*, v. 10, Sept. 1953, p. 21-22.

Single- and double-action presses. Data on die cushions for both. Diagrams. (G1)

335-G. Stretch Wrap Forming Cuts Fabricating Costs. I. L. F. Spencer. *Iron Age*, v. 172, Sept. 3, 1953, p. 120-124.

Process, uses and advantages of stretch wrap forming. Diagrams, photographs, tables. (G9)

336-G. Stretch Wrap Forming Cuts Fabricating Costs. II. L. F. Spencer. *Iron Age*, v. 172, Sept. 10, 1953, p. 163-167.

Equipment and process. Photographs, diagrams. 5 ref. (G9)

337-G. How to Select the Proper SFM in Milling Operations. H. A. Frommelt. *Machine and Tool Blue Book*, v. 49, Sept. 1953, p. 151-158, 160.

Nature, calculation and selection of surface foot rate for milling operations. Tables. (G17)

338-G. New Diamond Wheel Grinds to a Depth of 1/8 In. in Carbide Without Loading. William F. Schleicher. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 229-232.

Properties and action of wheel. Photographs. (G18)

339-G. Removing Wrinkles in Formed Aluminum Sheets. Gilbert C. Close. *Machinery,* v. 60, Sept. 1953, p. 188-190.

New "clip" device attached to the sheet to be formed, reducing wrinkling. Diagrams, photographs. (G1, Al)

340-G. Electrolytic Grinding. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, Aug. 29, 1953, p. 68-70.

Process and its advantages. Diagrams. (G18)

341-G. The Electro Erosion Process. J. L. Adcock. *Machinery* (London), v. 83, Aug. 21, 1953, p. 355-359.

Electrolytic, electro arcing, and electro sparking methods for cutting metals. Photographs. (G17)

342-G. High Speed Machining of Aluminium Alloy Castings. *Machinery* (London), v. 83, Sept. 11, 1953, p. 524-526.

Advantages of increased running speed of milling machines. Photographs, diagrams. (G17, Al)

343-G. Electrospark Machining. C. R. Alden. *Mechanical Engineering,* v. 75, Sept. 1953, p. 701-705.

Machining of conductive work materials by direct application of electric sparks. Diagram, photographs. 14 ref. (G17)

344-G. Press-Forming Process. *Metal Industry,* v. 83, Aug. 28, 1953, p. 169-170.

Press-forming technique which permits the use of a rubber pressure pad as a female die and an inexpensive form block as a punch. Photograph, diagrams. (G8)

345-G. Grinding Carbide Tools With Electrolytic Assistance. Newman W. Thibault and Bertil H. Anderson. *Metal Progress,* v. 64, Aug. 1953, p. 161-166.

Diamond-wheel grinding of cemented carbides. Equipment and results. Tables, photographs. (G18, SG-j, C-n)

346-G. Remarks in Connection With the Problem of the Two-Dimensional Thermal Flow in the Vicinity of a Tool Cutting Edge. E. Bickel. *Microtecnic* (English Ed.), v. 7, no. 3, 1953, p. 134-135.

Translated from the German. Mathematical analysis. Diagrams. (G17)

347-G. Study of External Cylindrical Grinding. H. Opitz. *Microtecnic* (English Ed.), v. 7, no. 4, 1953, p. 162-170.

Translated from the German. Quantitative relationships between infeed, table speed, lateral feed, speed of work, speed of grinding wheel, scratch depth, peripheral force and wheel life. Photograph, diagrams, graphs. (G18, ST)

348-G. Press Brakes for Press Work. *Modern Industrial Press,* v. 15, Aug. 1953, p. 26, 28, 32, 36, 50, 52, 56.

Pressing and forming equipment and methods. Photographs. (G1)

349-G. Simplified Production of Steel Equipment. Howard E. Jackson. *Modern Industrial Press,* v. 15, Aug. 1953, p. 38, 40, 42, 44, 46, 48.

Pressing and forming equipment and procedure. Photographs. (G1, ST)

350-G. Punch Presses Turn Out Quality Product at West Wind Corporation. Howard E. Jackson. *Modern Industrial Press,* v. 15, Sept. 1953, p. 36, 38, 40, 42, 44.

Design, construction, manufacture and general use of the West Wind ventilating fan. Photographs. (G2)

351-G. Press Forming Magnesium Alloy Sheet and Plate. Harry Wilkens Perry. *Modern Industrial Press,* v. 15, Sept. 1953, p. 52, 54, 56, 58.

Differences in fabrication of Mg and other metals, emphasizing advantages of the former. Photographs, diagram. (G1)

352-G. Forming Steel With Plastics Dies. F. B. Stanley. *Modern Plastics,* v. 31, Sept. 1953, p. 109-112, 114.

Forming techniques, glass cloth for faces of dies and curing. Photographs. (G general, ST)

353-G. Big Press Takes on New Dimensions. *Steel,* v. 133, Sept. 7, 1953, p. 130.

Throatless press suspended from single concrete press structure. Diagram, photographs. (G1)

354-G. Press Brake Forming As a Production Tool. Lester F. Spencer. *Steel Processing,* v. 39, Sept. 1953, p. 441-449, 468-469.

Flexibility of performance, simplification of tool design, and low cost tooling are advantages. Photographs, tables. 8 ref. (G1)

355-G. Wear of Carbide Tools. Its Effect on Surface Finish and Dimensional Accuracy. A. J. Pekelharing and R. A. Schuermann. *Tool Engineer,* v. 31, Oct. 1953, p. 51-57.

Results of various machining operations on parts made of typical steels using single point carbide tools. Diagrams, charts. 3 ref. (G17, Q9, C-n)

356-G. Roll Forming. Simple Method for Designing Rolls. Elmer J. Vanderploeg. *Tool Engineer,* v. 31, Oct. 1953, p. 59-65.

Principles and rules. Steps in forming a typical shape. Diagrams, photographs. (G11)

357-G. Laboratory Precision of Riverbank Production Line Spells Quality Control. Robert T. Reinhardt. *Western Metals,* v. 11, Sept. 1953, p. 51-55.

Imposing array of 65 presses, precise heat treat controls, and West's first major spheroidizing plant combine to produce wide range of artillery shell cases at Norris-Thermador plant. Photographs. (G general, T2)

358-G. Standardized Carbide Fastener Nib Dimensions Meet Most Cold Heading Needs. A. Earle Glen. *Wire and Wire Products,* v. 28, Sept. 1953, p. 885-886, 928-930.

Use of cold heading dies and use of die nibs of standardized dimensions for more economical production. Diagrams. (G10)

359-G. (French.) **The Dissolution Potential of Chromite Alloys After Abrasion in an Inert Atmosphere.** Henry Hatwell. *Comptes rendus,* v. 236, no. 19, May 11, 1953, p. 1881-1883.

Surface measurements made of various metals after abrading in a pure argon atmosphere to remove oxide layers. Table, diagram, graph. (G18, Al, U, CN, Zr)

360-G. (French.) **Variation of the Internal Energy of Metals Caused by Cold Working.** Félix Eugene. *Comptes rendus,* v. 236, May 21, 1953, p. 2071-2073.

Problem of mechanical energy consumed by the tool during cutting of metal. (G17, P12)

361-G. (French.) **Machining of Stainless Steel.** Jean Daurat. *Métallurgie et la construction mecanique,* v. 85, no. 7, July 1953. p. 557-561.

Turning and screw cutting. Diagrams, tables. (To be continued.) (G17, SS)

362-G. (German.) **Machinability of Light Metals.** W. Späth. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 292-297.

Service life versus cutting speed. Short-time tests were used. Graphs, tables. 9 ref. (G17, Al)

363-G. (German.) **New Process for Facilitating Deep Drawing of Aluminum Alloys.** *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 607.

Protective pretreatment. Photograph. 2 ref. (G4, Al)

364-G. (German.) **Effect of Steel Production Method on Deep-Drawing Characteristics of Sheets.** Friedrich Eisenkolb and Theo Brüggemann. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 967-970.

Influences of melting practice and C content were studied on open-hearth, electric and Bessemer steels. Photographs, micrographs, graphs. (G4, D general, CN)

365-G. (Book.) **Fabricated Materials and Parts.** T. C. Du Mond. 332 p. 1953. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. $6.50.

Discusses methods of producing small industrial parts. Compares costs, materials, advantages and limitations of the processes, design factors, size ranges and tolerances which can be met. (G general)

H
Powder Metallurgy

107-H. The Borolites. High Temperature Materials by Powder Metallurgy. Paul Schwarzkopf. *Research Reviews,* Aug. 1953, p. 25-30.

Characteristics of cemented borides for use at high temperatures. Photographs. (H general)

108-H. Powdered Aluminium. R. H. Warring. *Mechanical World and Engineering Record,* v. 133, Aug. 1953, p. 350-352.

Methods used in manufacture. Diagrams. (H10, Al)

109-H. Measurement of Particle Size of Fine Ferromagnetic Powders. A. D. Franklin, R. Campbell, and J. Weinman. *Journal of Applied Physics,* v. 24, Aug. 1953, p. 1040-1045.

Particle sizes of four Fe and two Fe-Co powders with diameters from 200 to 600 Å. were determined using electron microscope, X-ray line broadening, and nitrogen adsorption techniques. Method of dispersing single-domain ferromagnetic powders for electron microscopy. Tables, graphs, micrographs. (H11, M21, Fe, Co)

110-H. Report of Committee B-9 on Metal Powders and Metal Powder Products. F. V. Lenel, chairman, American Society for Testing Materials, Preprint no. 15, 1953, 6 p.

Specifications covering sintered powder gears, cams, levers, lock hardware and other structural parts. Tables. (H general, S22, Cu)

111-H. Subsieve Particle-Size Measurement of Metal Powders by Air Elutriation. Rolla E. Pollard. *Journal of Research, National Bureau of Standards,* v. 51, July 1953, p. 17-31.

Measurements of spherical metal powders by means of the "Roller" air analyzer, using samples up to 40 g. of powder. Diagram, graphs, micrographs, tables. 15 ref. (H11)

112-H. Magnesium Powder Is Becoming Big Business. *Magnesium,* Aug. 1953, p. 12-16.

Safety precautions, production and research in a Mg powder plant. Photographs. (H general)

113-H. Manufacture of Cemented Carbides. Carl Ballhausen. *Metal Progress,* v. 64, Aug. 1953, p. 166, 168, 170, 172, 174, 178, 180.

Digest of "Changes in the Techniques of Manufacturing Cemented Carbide Alloys," *Stahl und Eisen*. See item 5-H, 1952.
(H12, H14, H15, C-n)

114-H. Survey of Developments in Hard Metals. E. J. Sanford. *Metal Progress,* v. 64, Sept. 1953, p. 132, 134, 138.
Condensed from "Recent Developments in Hard Metals", *Alloy Metals Review,* v. 8, Mar. 1953.
(H general)

115-H. Recent Developments and Trends in Powder Metallurgy. H. W. Greenwood. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 427-429, 431.
Progress and trends in production and applications. Table. 7 ref.
(H general, SS, Ni, C-n, Al, Fe, Mg)

116-H. Review & Progress Report. Aluminum Powder Metallurgy. J. B. Haertlein and J. F. Sachse. *Modern Metals,* v. 9, Sept. 1953, p. 54-55, 58, 60-61.
Production and applications of Al powder and powder products. Photographs, tables, graphs.
(H general, T general, Al)

117-H. (French.) **Sintering of Zirconium Carbide by Hot Pressing. Some Preliminary Results of Resistance of Carbides to Oxidation.** W. Watt, G. H. Cockett, and A. R. Hall. *Metaux Corrosion-Industries,* v. 28, no. 333, May 1953, p. 222-237.
Zr, Ti, V, Ta carbides oxidized readily at 8000° C. in dry air. Cr_3C_2 resisted oxidation up to 1000° C. Diagrams, graphs, photographs, microphotographs, tables. 28 ref.
(H15, Zr, Ti, V, Ta, Cr)

118-H. (German.) **Flow Properties of Silver Powder.** Albert Keil. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 292-294.
Heat treatment to minimize tendency to form agglomerates. Photographs. 6 ref. (H11, Ag)

119-H. (Portuguese.) **Some Experimental Data on the Production of Hard Sintered Carbides.** Vicente Chiaverini. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 5-20.
Experimental production of sintered W, Ti and Ta carbides. Properties, details of the sintering process and effects of various factors upon their hardness. Tables.
(H15, H11, W, Ti, Ta)

120-H. (Book.) **Metal Powder Association, Proceedings.** (Annual Volume.) 111 p. 1953. Metal Powder Association, 420 Lexington Ave., New York 17, N. Y. $2.50.
Use of metal powders and powder metallurgy in electronics, the production of precision high density parts, applications such as friction materials for automatic transmissions, alloy powders, non-metallic impregnation, and the powder metallurgy of aluminum. (H general, Al)

J. Heat Treatment

195-J. How Natural Gas Helps Make the Tools That Drill for More Natural Gas. Arthur Q. Smith. *Industrial Gas,* v. 32, Aug. 1953, p. 3-5, 26.
Gas-fired heat treating equipment for producing drill bits. Photographs. (J general)

196-J. Continuous Short-Cycle Anneal for Spheroidization of Cartridge-Case Steel. O. E. Cullen. *Metal Progress,* v. 64, July 1953, p. 79-82.
Proper annealing treatment to develop suitable microstructure. Micrographs, diagrams. (J23, CN)

197-J. Jet Principle Blasts Annealing Troubles. W. K. Lombard. *Steel,* v. 133, Aug. 24, 1953, p. 80-81.
New high-velocity burner which steps up circulation in the furnace without mechanical means. Diagrams, photographs. (J23)

198-J. Gear Steels. Heat Treating Gives Them Life. John Obrebski. *Steel,* v. 133, Aug. 31, 1953, p. 94-96.
Carburizing and heat treating to improve wear resistance. Photographs, diagram. (J28, Q9, CN, AY)

199-J. Pack Carburizing Aspects and Developments. John E. Hyler. *Steel Processing,* v. 39, Aug. 1953, p. 386-389.
Use of cylindrical pots or boxes. Photographs. (J28)

200-J. Restoration of Ductility in Alloy Titanium Welds. A. J. Rosenberg, E. F. Hutchinson, and S. Weiss. *Welding Journal,* v. 32, Aug. 1953, p. 708-714.
Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Unique heat treating processes. Graphs, micrographs.
(J general, K1, Ti)

201-J. (French.) **Surface Hardening of Machine-Tool Slides.** E. Blanpain. *Soudure et Techniques Connexes,* v. 7, nos. 1-2, Jan.-Feb. 1953, p. 46-49.
Experimental study on flame hardening techniques. Photographs, graph. (J2, CI)

202-J. One Setup Heat Treats Wide Variety of Work. S. W. Chantler and F. C. Schaefer. *Iron Age,* v. 172, Sept. 24, 1953, p. 131-134.
Single installation designed for three categories of work which heat treats nuts and fasteners of many shapes, sizes, and materials. Photographs, diagram. (J general)

203-J. How Heat Treatment Affects Properties of Cold Worked 18-8 Wire. Samuel Storcheim. *Iron Age,* v. 172, Oct. 1, 1953, p. 112-114.
Changes of mechanical and physical properties. Tables, charts.
(J general, Q general, P general, SS)

204-J. Carbon Steel Can Replace Alloy for Small Diameter Bolts. A. S. Jameson, J. A. Halgren, and R. H. Pinkel. *Iron Age,* v. 172, Sept. 17, 1953, p. 153-156.
Importance of hardenability in selection of lean alloy or carbon steel to replace more highly alloyed steels. Graphs, tables. (J26, CN)

205-J. Age Softening of Beta Brass. Harry Green and Norman Brown. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1240-1244.
Effect of quenching temperature and of aging temperature and time on compression stress-strain curves of beta-brass was investigated. Graphs. (J26, Q28, Cu)

206-J. Titanium. The New Light Metal. *Light Metals,* v. 16, Sept. 1953, p. 308-309.
Surface hardening and electroplating of Ti. Graph. (Concluded.)
(J28, L17, Ti)

207-J. A Test for Measuring Quench Crack Sensitivity of Engineering Alloy Steels. R. D. Chapman and Walter E. Jominy. *Metal Progress,* v. 64, Sept. 1953, p. 67-72.
Effect of quenching temperature and conditions, steel composition, and other factors on tendency to "crackability" specimen. Diagrams, table, graphs, photographs.
(J26, AY)

208-J. Hard, Strong Ti-Fe Alloys. H. W. Worner. *Metal Progress,* v. 64, Sept. 1953, p. 128, 130, 132.
Previously abstracted from "Heat Treatment of Titanium-Rich Titanium-Iron Alloys", *Institute of Metals, Journal.* See item 55-J, 1952.
(J26, J27, Ti)

209-J. Oxiding. A Method of Hardening Metal. J. L. Meijering. *Metal Progress,* v. 64, Sept. 1953, p. 182, 184, 186.
Previously abstracted from "Hardening of Metals", *Philips Technical Review.* See item 78-J, 1953. (J26)

210-J. Automatic Heat Treatment of Crankshafts in Hagan Automatic Units. C. H. Schwerin. *Metal Treating,* v. 4, July-Aug. 1953, p. 2-3.
Automatic equipment and operation cycles. Photographs.
(J general)

211-J. Large Rotary Hearth Furnace. Horace C. Knerr. *Metal Treating,* v. 4, July-Aug. 1953, p. 4-5.
Describes construction. Photographs, diagrams. (J general)

212-J. The Importance of Heat Treatment in the Manufacture of Oil Well Sucker Rods. G. H. Dickinson. *Metal Treating,* v. 4, July-Aug. 1953, p. 8-9, 34.
(J general)

213-J. How Boron Enhances the Hardenability of Steel. Thomas G. Digges. *SAE Journal,* v. 61, Sept. 1953, p. 24-28.
Excerpts from paper presented at SAE Annual Meeting, Detroit, May 18, 1953. Reviews previous work and gives facts known about action of B in steel. Graphs. (J26, AY)

214-J. Pack Carburizing Aspects and Developments. III. John E. Hyler. *Steel Processing,* v. 39, Sept. 1953, p. 459-462, 475.
Advantages of pusher-type furnace, temperature and time control, varying rate of carburization, localized carburization, and inhibiting Cu migration. Photographs. (J28)

215-J. In-Plant Heat Treating Saves $3000 Per Year. R. W. Blasser. *Steel Processing,* v. 39, Sept. 1953, p. 465-469.
In-plant vs. outside processing, gas vs. electricity, and flexible equipment. Photographs, tables.
(J general)

216-J. Dual Heat Treat Set-Up for Aircraft Fasteners. Charles Palmer. *Western Metals,* v. 11, Sept. 1953, p. 59-61.
Fast flow of production gives clean, bright, decarb-free parts. Unit has controlled atmosphere hardening and tempering. Photographs, diagram. (J26, J29)

217-J. Electric Furnaces for the Wire Industry. Ernst von Kannen. *Wire and Wire Products,* v. 28, Sept. 1953, p. 887, 928.
Exact temperature control needed in heat treatment of wire. Photographs. (J general, CN)

218-J. Molten Salts for the Wire Industry. F. R. Morral and F. A. Schaufelberger. *Wire and Wire Products,* v. 28, Sept. 1953, p. 889-893, 921, 923.
Usefulness, versatility and ease of control of molten salts in heat treatment of metals. Tables, graphs.
(J2, CN)

219-J. (Dutch.) **Controlled Atmosphere for Steel With Adjustable Carbon Potential.** J. W. Holleman, W. A. Holleman, W. A. Schultze, and M. A. De Jongh. *Metalen,* v. 8, no. 14, July 31, 1953, p. 279-282.
Experimental installation based on thermal cracking of coal gas. Diagrams, graphs, microphotograph. 8 ref. (J2, ST)

220-J. (French.) **The Effect of Working Conditions and of Heat Treatment Upon the Properties of Heat-Resistant Light Alloys.** R. Syre. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 301-310.
Pilot-plant investigations. Effects

of casting, homogenization, and tempering. Tables, photographs. 7 ref. (J general, Q general, EG-a)

221-J. (German.) **Hardening Temperature for Hardness Testing of Case-Hardened Steel.** Heinz Kiessler. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1116-1117.

Double vs. single hardening temperatures. Graphs, tables. (J26, Q29, ST)

222-J. (German.) **The Annealing of Seams for Arc-Welded Vessels.** F. Gentner. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 211-216.

Mechanical properties of unannealed, stress relieved, heat treated, and air-hardened arc welds. Comparative tests with basic bessemer steel. Tables, graphs. (J23, K9, Q general, ST)

223-J. (German.) **Experience With Oxy-Acetylene Stress-Relieving of Pressure Vessels.** Hans Kunz. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 216-225.

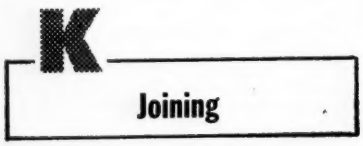
Measuring and relieving of residual stresses. Photographs, diagrams, graphs. 18 ref. (J1, ST)

224-J. (Spanish.) **To What Extent Does Stress Relief Take Place at Temperatures Between 200 and 300° C?** Rudolf Gunnert. *Ciencia y Técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 12 p.

Ratios between stresses and elastic limits of welded specimens were investigated under various heating conditions. Diagrams, photographs. 6 ref. (J1, K9)

225-J. Induction Furnaces for High Temperature. Frank T. Chesnut. *Industrial Heating,* v. 20, Sept. 1953, p. 1690, 1692, 1694, 1696, 1698.

Design and use of graphite induction furnaces capable of maintaining temperatures of 1500° C to 3600° C. Applications are for carbide processing, hot pressing and sintering, production of Mg. Diagrams, photographs. (J2, C21, H14, H15)



548-K. Controlled Internal-Contour Shielded-Root Welds Without Backing Rings. Charles Diehl, H. S. Blumberg, and W. G. Benz, Jr. *ASME, Transactions,* v. 75, Aug. 1953, p. 1103-1110; disc., p. 1110-1115.

"K-Weld" process. Diagram, photographs. (K1)

549-K. Research Findings on Brazing and Soldering Titanium. H. L. Meredith. *Automotive Industries,* v. 109, Aug. 15, 1953, p. 34-37, 152.

Brazing, soldering, induction brazing, filler metal alloying characteristics and heliarc brazing. Photographs, micrographs. (K8, K7, Ti)

550-K. Fast Roll-Spot Technique Doubles Welding Speeds. J. R. Fullerton. *Automotive Industries,* v. 109, Aug. 15, 1953, p. 46-47, 98.

New technique and equipment for welding stainless steel, Inconel "X" and "W", Haynes Stellite No. 25, and other crack-sensitive alloys. Micrographs. (K3, Ni, Co, SS)

551-K. Welding for Refrigeration. *Canadian Metals,* v. 16, Aug. 1953, p. 41.

New production welding techniques to make refrigeration condensing units two-thirds present size. Photographs. (K general)

552-K. Failures in Welded Bridges. *Canadian Metals,* v. 16, Aug. 1953, p. 48, 50.

Review of information on the weldability of steel by the National Research Council, Ottawa. (K9, ST)

553-K. On the Research of Welding and Welding Rod for Cast Iron. I. The Investigation of Commercial Welding-Rod for Cast Iron. Kiyoshi Yokota and Sukeharu Eto. *Castings Research Laboratory, Report,* no. 4, 1953, p. 60-62.

Table, graph, photomicrograph. (K9, CI)

554-K. Welding Research Leads the Way Toward Stronger, More Economical Structures. La Motte Grover. *Civil Engineering,* v. 23, Aug. 1953, p. 29-33, 95.

Condensed from paper presented at joint session of ASCE Structural Div. and AWS in Chicago. Structural welding processes, impact tests of welded beams, effect of coped holes in web and plastic analysis in design. Photographs, diagrams. (K general, K9, Q6, Q25)

555-K. Resistance Welding Builds Stronger, Lighter Auto Bodies. *Industry & Welding,* v. 26, Sept. 1953, p. 31-34, 72-73.

Welding operations. Photographs. (K3)

556-K. Skipwelding Minimizes Distortion in Heavy Weldments. *Industry & Welding,* v. 26, Sept. 1953, p. 40-42, 94-95.

Manual arc welding. Photographs. (K1)

557-K. Maintenance Welding Reduces Downtime for Food Processing Firm. *Industry & Welding,* v. 26, Sept. 1953, p. 45-46.

Various welding processes and strict quality control. Photographs. (K general)

558-K. Positioning for Downhand Welding Cuts Fabrication Time 30 Percent. *Industry & Welding,* v. 26, Sept. 1953, p. 48, 71.

Equipment. Photographs. (K general)

559-K. Don't Bargain With Arc Welding Booby Traps. *Industry & Welding,* v. 26, Sept. 1953, p. 52-54, 96-97.

Safety devices and operations. (K1)

560-K. Efficient Use of Welding Fittings Speeds Pipe Fabrication. C. F. Brown. *Industry & Welding,* v. 26, Sept. 1953, p. 65-68, 70.

Fittings and assemblies. Diagrams. (K general)

561-K. Flash Welding and High Speed Cold Reduction of Strip Steel for Tin Plate. John Wargo and Ray C. Brunner. *Iron and Steel Engineer,* v. 30, Aug. 1953, p. 59-64.

Equipment and techniques. Graphs photographs. (K3, F23, CN)

562-K. Electrodes for Welding Mild Steel. *Machinery Lloyd (Overseas Ed.)* v. 25, Aug. 1953, p. 106-108.

New Quasi-Arc electrodes. Weld metal, procedure and high-arc voltage. Photographs. (K1, CN)

563-K. Flash Welding of Railway Rails. Reinhold Keuhnel. *Metal Progress,* v. 64, July 1953, p. 138, 140, 142.

Translated and condensed from "Electrical Resistance Flash Welding of Railway Rails", *Stahl und Eisen,* v. 72, Oct. 23, 1952, p. 1346-1348. (K3, CN)

564-K. "Elastic Reserve" Is Key to Wrapped Wire-Terminal Joints. A. H. Allen. *Metal Progress,* v. 64, July 1953, p. 161, 164, 166, 168, 170, 172, 174.

Review by Bell Telephone Laboratory engineers on design, analysis and tests of solderless wrapped connections. Photographs, tables. (K12, Cu)

565-K. Aluminum Sheet Metal Practice in the Building Industry. *Modern Metals,* v. 9, May 1953, p. 28-30, 32-37; June 1953, p. 58-64; July 1953, p. 34-35, 37-38, 40; Aug. 1953, p. 67-73.

Part I: Fabricating practices and joining techniques including welding, brazing and soldering. Part II: Installation of batten-seam roofs. Part III: Installation details for standing and flat-seam roofs. Part IV: Installation procedures for corrugated and ribbed roofing and siding. Diagrams. (K general, Al)

566-K. Correct Welding Procedure. IV. Lester F. Spencer. *Sheet Metal Worker,* v. 44, June 1953, p. 63, 65-66; Aug. 1953, p. 102-103, 107.

Welding of coated metals such as aluminized and galvanized steel, terne and tin plate and plated steels. Photographs. (K general, ST)

567-K. High-Speed Automatic Projection Welding. C. E. Slade. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 281-285.

Describes and illustrates the equipment. (K3)

568-K. Brazing by Induction. D. Warburton-Brown. *Welding and Metal Fabrication,* v. 21, July 1953, p. 238-241; Aug. 1953, p. 291-295.

Part I: Compares induction brazing with torch, furnace, dip, resistance and salt bath brazing. Part II: Brazing of tool tips, filler caps to containers, refrigerator components, steering column assemblies and stainless steel parts. Photographs, diagrams. (K8, Cu, Ag, SS)

569-K. Aluminium Alloy Yacht of Welded Construction. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 298-300.

Arc welding techniques. Photographs. (K1, Al)

570-K. Inert-Gas Metal-Arc Welding of Mild and Low-Alloy Steel. Frank G. Harkins. *Welding Journal,* v. 32, Aug. 1953, p. 683-689.

Presented at Western Metal Congress, Los Angeles, Calif., Mar. 23-37, 1953. Application to aircraft quality materials. Photographs. (K1, AY)

571-K. Relation Between Welding Current and Appropriate Transmission of Filter Glasses. T. Rosskopf. *Welding Journal,* v. 32, Aug. 1953, p. 689-691.

Formula for determining most suitable eye protection. Tables, graphs. (K general, A7)

572-K. Stranded Electrode Materials for Aircomatic Welding. Harold Robinson and Harry C. Cook. *Welding Journal,* v. 32, Aug. 1953, p. 692-702.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Fabrication methods, compositions, welding characteristics, deposit properties and field applications. (K1, Al, Fe, Cu)

573-K. Fillerarc Welding Process. R. W. Tuthill. *Welding Journal,* v. 32, Aug. 1953, p. 703-707.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Developments and experimentation to market new equipment for consumable-electrode gas-shielded welding. Graphs, photographs. (K1)

574-K. Tricky Problems in Welded Ship Repair. Milton Forman. *Welding Journal,* v. 32, Aug. 1953, p. 715-720.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Analysis of suitable sequence in welding, proper use of preheating, suitable joint design and careful workmanship. Diagrams. (K general)

575-K. Joining Aluminum to Other Metals. Mike A. Miller. *Welding Journal,* v. 32, Aug. 1953, p. 730-740.

Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Methods and materials

for brazing, soldering, welding and resin bonding. Photographs, micrograph, table. 19 ref.
(K general, Al, St, Cu)

576-K. Heliarc Welding Helps Fabricate Nickel Pipe. *Welding Journal,* v. 32, Aug. 1953, p. 743.
Photograph. (K1, Ni)

577-K. Effects of Electrodes and Heat Treatments on Mild Steel Weldments. Ernest F. Nippes and Alexander Lesnewich. *Welding Journal,* v. 32, Aug. 1953, p. 353S-374S.
Presented at Thirty-Third National Fall Meeting, AWS, Oct. 19, 1952, Philadelphia, Pa. Beneficial effects of low-H type electrodes, preheat, post-heat and stress-relief heat treatments on the ductility and transition temperature of mild steel weldments. Tables, graphs, micrographs, diagrams. 29 ref.
(K1, J general, CN)

578-K. A Qualitative Study of Residual Stresses in Welds by Photoelasticity. Melvin Mark. *Welding Journal,* v. 32, Aug. 1953, p. 374S-377S.
Pictorial evidence of the effect on residual stresses of reducing the temperature difference in the vicinity of the weld by local heating. Photographs, graphs. 5 ref.
(K9, Q25)

579-K. Welding Metallurgy of Nodular Cast Iron. Edward E. Hucke and Harry Udin. *Welding Journal,* v. 32, Aug. 1953, p. 378S-385S.
Structure of two heat-affected zones and weld metal in nodular iron with and without preheat and postheat. Tables, micrographs, graphs. (K general, E25, CI)

580-K. The Incidence of Cracking in Welding Type 347 Steels. L. K. Poole. *Welding Journal,* v. 32, Aug. 1953, p. 403S-412S.
Survey of types and occurrence of cracking in various type welds. 14 ref. (K general, SS)

581-K. Speeds Production at Fentron Steel. Howard E. Jackson. *Western Machinery and Steel World,* v. 44, Aug. 1953, p. 87-90.
Manufacturer of steel windows and doors redesigned production methods and incorporated resistance welding for basic means of fabrication. Photographs. (K3, ST)

582-K. (Swedish.) **Pipe Formation in Welded Material.** Stig-Erik Erikson and Tore Norén. *Svetsaren,* v. 18, no. 1, 1953, p. 1-9.
Causes and ways of avoiding weld defect. Diagrams, photographs, photomicrographs. 6 ref.
(K general, ST)

583-K. (Swedish.) **OK H-Electrodes Used in Swedish Steel Mills.** Stig Lundin. *Svetsaren,* v. 18, no. 1, 1953, p. 9-13.
Composition and use of four types of alloy electrodes used for repair welding. Tables, photographs.
(K1, T5, AY)

584-K. Bell Wraps Solderless Connection for Joint Economy. Charles Emerson. *American Machinist,* v. 97, Aug. 31, 1953, p. 100-101.
Wrapping tool and advantages of the process. Photographs. (K13)

585-K. How to Butt-Weld 0.005-In. Stainless. Marvin S. Weinstein. *American Machinist,* v. 97, Aug. 31, 1953, p. 102-104.
How condenser-discharge techniques were used to butt weld 0.005- and 0.008-in. stock by spot welding. Photographs, diagrams. (K3, SS)

586-K. Report of Committee D-14 on Adhesives. Gerald Reinsmith, chairman. *American Society for Testing Materials,* Preprint no. 45, 1953, 11 p.
Recommendations, activities of subcommittees and methods of test for strength properties and effects of mold contamination. (K12)

587-K. Report of AWS-ASTM Joint Committee on Filler Metal. E. H. Turnock, chairman. *American Society for Testing Materials,* Preprint no. 63, 1953, 2 p.
Reports of subcommittees on mechanical properties.
(K general, Q general, ST, Cr, Cu, Al)

588-K. Landing Gear Struts Induction Preheated Before Arc Welding. Merle W. McLaughlin. *Automotive Industries,* v. 109, Sept. 15, 1953, p. 40-41.
Process and advantages. Photographs. (K1, J2, AY)

589-K. Modern Welding Technique. E. T. Gill and Eric N. Simons. *Edgar Allen News,* v. 32, Sept. 1953, p. 201-202.
Advantages, disadvantages and precautions in the use of various welding methods. (To be continued.) (K general, SS)

590-K. Automatic Arc Welding of Helically Wound Tubes. I. L. Brinberg, P. G. Rybalko, M. F. Khrobastov and V. P. Yakushjin. *Engineers Digest,* v. 14, Aug. 1953, p. 293-294, 315-316.
Translated and condensed from *Avtogennoye Delo,* no. 4, Apr. 1953, p. 1-6. Advantages of welded tubes and particularly helically wound tubes. Development work leading to the construction of an automatic production line for wound tubes. Separate processes. (K1)

591-K. Improve Your Soldering With Noncorrosive Flux. W. S. Gale. *Iron Age,* v. 172, Sept. 3, 1953, p. 115-119.
Properties and uses of the fluxes. Photographs. (K7)

592-K. Adhesives. Agents for Bonding Fibrous Glass Pads to Metal. W. J. Clayton. *Iron Age,* v. 172, Sept. 17, 1953, p. 160-163.
Application techniques and advantages of adhesives. Photographs. (K11)

593-K. Developments in Submerged Melt Welding for Steel Plant Maintenance. D. E. Knight. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 98-104; disc., p. 104.
Process and advantages of submerged melt welding. Diagrams, graph, photographs. (K1)

594-K. Plant Welding Applications. H. J. Ralston. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 105-112.
Use of various welding processes valuable in steel plant maintenance. Photographs. (K general)

595-K. Cracking Temperature of Mild Steel Arc Welds During Cooling. Takuro Kobayashi. *Japan Science Review, Engineering Sciences,* v. 2, Apr. 1952, p. 287-295.
Method of estimating the cracking temperature by determining the degree of crystal fragmentation or lattice distortion on the surface of the cracks. Data determined by X-ray diffraction. Diagrams, photographs, table. 3 ref. (K1, K9, CN)

596-K. Filler Material for the Brazing of Titanium. N. A. DeCecco and H. M. Meyer. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1197-1198.
Use of Ag in brazing Ti. Explains why some brazing metals are unsatisfactory. 14 ref. (K8, Ti, Ag)

597-K. Aluminum Soldering. David Nova. *Light Metal Age,* v. 11, Aug. 1953, p. 20-37.
Problems and methods. Photographs. (K7, Al)

598-K. Brazing of Cemented Carbide Tools and Parts. F. J. Lennon, Jr. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 174-176, 178-180, 182.
Techniques. Photographs.
(K8, C-n)

599-K. Victor Equipment Company Cuts Cost, Increases Production. Fred M. Burt. *Machine and Tool Blue Book,* v. 49, Sept. 1953, p. 219-220, 222, 224, 226-227.
Apparatus and plant layout of a welding equipment manufacturer. Photographs. (K general)

600-K. Practical Stud Welding. R. W. Taylor. *Machinery (London),* v. 83, Aug. 28, 1953, p. 433-436.
Studs and attachments, power sources, relationship between stud diameter and plate thickness, local hardening and comparative costs. Photographs, diagram. (K1)

601-K. Select the Right Method to Join Aluminum to Other Metals. Mike A. Miller. *Materials & Methods,* v. 38, Sept. 1953, p. 96-99.
Materials involved, design of parts, permissible joining temperature and service requirements. Table, photographs. (K general, Al, W, Ti, Fe, Cu, Ni, Mg, Ag, Pb, Zn, Sn)

602-K. Fabricating Chemical Plant. J. F. Lancaster. *Metal Industry,* v. 83, Sept. 4, 1953, p. 192-194.
Use of argon-arc and Argonaut gas-shielded welding of various metals. Photographs. 4 ref. (K1)

603-K. Recent Developments in the Fusion Welding of Iron and Steel. J. W. Shedden and W. I. Pumphrey. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 78-84.
Electrode coatings, low-hydrogen electrodes, stainless steel welds, arc welding of cast iron, automatic inert-gas-shielded-arc welding and gas welding. Photographs, micrographs, tables, graphs. 20 ref.
(K general, CI, SS, ST)

604-K. Chrysler Achieves High Production Rate with Automatic Welding. Herbert Chase. *Modern Machine Shop,* v. 26, Sept. 1953, p. 170-172, 174-175.
Special fixtures and welding techniques. Photographs. (K1)

605-K. "Metal Surgery" Reclaims Fractured Refrigeration Plant and Machinery. Clark Matthew. *Modern Refrigeration,* v. 56, Aug. 1953, p. 293-294.
Method of repairing metal equipment based on principle of corrugated fasteners to secure stress-points in wood. Diagrams. (K13)

606-K. Effect of Variation in Rivet Strength on the Average Stress at Maximum Load for Aluminum-Alloy, Flat, Z-Stiffened Compression Panels That Fail by Local Buckling. Norris F. Dow, William A. Hickman, and B. Walter Rosen. National Advisory Committee for Aeronautics, Washington, D. C., Technical Note no. 2963, June 1953, 17 p.
Relationship between strength, diameter and pitch of rivets in compression panels. (K13, Q28, Al)

607-K. Some Aspects of the Welding of the Austenitic Steels. F. A. Ball. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 790-799.
Ways in which welding of these steels differs from that of mild steel and possible changes in technique. Photographs, graphs, micrographs, table. 5 ref.
(K general, AY)

608-K. The Welding of Stainless and Heat-Resistant Materials at the Works of Welding Technical Services Ltd. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 805-815.
Various methods of welding strip, sheet, light plate and various fabricated units. Tables, photographs. 23 ref. (K general, SS, Ni, Cr)

609-K. Automatic Welding Improves Stainless Tube Output. *Steel,* v. 133, Sept. 21, 1953, p. 190-191.
Method and advantages of automatic inert-gas-shielded W-arc welding. Photographs. (K1, SS)

610-K. Locating Dimensions for Tube Welding Fixtures. Hans W. Smith. *Tool Engineer,* v. 31, Sept. 1953, p. 47-48.

Data on tube flare dimensions. Table, diagrams. (K general)

611-K. Welding Developments at Harland and Wolff. E. Cuthbert. *Welding and Metal Fabrication,* v. 21, Sept. 1953, p. 310-317.

Accurate flame profiling and automatic machine welding developments. Photographs. (K general, ST)

612-K. Developments in Metallic Arc Welding of Corrosion and Heat-Resisting Alloys. M. C. T. Bystram. *Welding and Metal Fabrication,* v. 21, Sept. 1953, p. 325-326.

Problems and importance of composition. (K1, SS, Ni, Cr)

613-K. Controlled Spot Welding of Light Alloys for Aircraft Production. N. K. Gardner. *Welding and Metal Fabrication,* v. 21, Sept. 1953, p. 335-337, 365.

Investigation of process and derivation of design strengths. Graphs, table. (To be continued.) (K3, Al)

614-K. Here's What You Need to Know to Weld High-Alloy Castings. I. Chromium Alloys. II. The Chromium-Nickel Alloys. Earl M. Anger, William E. Dundon, and Garth Thompson. *Welding Engineer,* v. 38, Apr. 1953, p. 48-52; May, 1953, p. 58-62.

Welding processes, preheating requirements, welding techniques and postweld heat treatment. Information on straight-Cr, Cr-Ni, hardenable and non-hardenable alloys. Tables, photographs. (K general, AY)

615-K. Bascule Gates Welded for Horseshoe Dam. T. B. Jefferson. *Welding Engineer,* v. 38, Sept. 1953, p. 39-41.

Construction and welding of the gates. Gamma-ray inspection. Photographs. (K general, S13, CN)

616-K. Bell, Buzzer and Thermostat. Herman C. Phelps. *Welding Engineer,* v. 38, Sept. 1953, p. 42-43.

Describes Ag brazing of the above in electric furnaces. Photographs. (K8)

617-K. Wooden Patterns for Thermit Welding. E. Russell. *Welding Engineer,* v. 38, Sept. 1953, p. 44-46.

Use of thermit welding to restore broken mill rods. Photographs. (K4)

618-K. Quality Control of Resistance Welds. G. A. Covington. *Welding Engineer,* v. 38, Sept. 1953, p. 48-51.

Inspection program. Photographs. (K3, S12)

619-K. How to Weld the Heat-Resistant Alloys. Earl M. Anger, William E. Dundon, and Garth Thompson. *Welding Engineer,* v. 38, Sept. 1953, p. 52-56.

Cr-Ni alloys, Si-C ratio, welding characteristics, flames for gas welding and arc-welding requirements. Photographs, tables. (K1, K2, SG-h)

620-K. Torch Maintenance for a Quarry. J. Dean Davidson. *Welding Engineer,* v. 38, Sept. 1953, p. 58-61.

Abstract of a paper presented at the annual meeting of the International Acetylene Assoc., Atlanta, Ga., Apr. 13-15, 1953. Heavy heating with oxy-acetylene flame, oxy-acetylene welding and O_2 cutting processes. Photographs. (K2, G22)

621-K. Wet Blasting for Silver Brazing. *Welding Engineer,* v. 38, Sept. 1953, p. 62.

Scale removal from parts to be brazed. (K8, L10)

622-K. (Czechoslovakian.) **Dependence of the Notch Bar Impact Strength of Welded Metals on the Mn and Si Content of the Electrodes.** Josef Ditl. *Hutnické Listy,* v. 7, no. 12, Dec. 1952, p. 637-639.

Maximum values obtained for 0.6-1.0% Mn. Si content had little effect in the range tested. Tables, diagram, graphs. (K1, Q6, Mn, Si)

623-K. (Czechoslovakian.) **Treatment and Use of Copper and Copper Alloy Plated Steel Sheets.** J. Valter. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 404-410.

Riveting, soldering and welding. Tables, diagrams, 7 ref. (K general, Cu, ST)

624-K. (French.) **The Problem of Fragile Welds on Tin-Plate Vessels.** W. E. Hoare and J. P. Gustin. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 301-310.

Effect of the steel surface, tin plating, the Fe-Sn alloyed layer and the average thickness of the coating. Tables, photographs, micrographs. (K general, L17, ST)

625-K. (German.) **Status of Riveting in Light-Metals Structural Engineering.** E. W. Pleines. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 299-305.

Developments in use of large light-metal rivets. Photographs, graphs, diagrams, tables. (To be continued.) (K13, Al)

626-K. (German.) **Aluminothermal Welding of Aluminum Current Conductors.** J. Bollinger. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 595-597.

Welding process for bare and insulated cables and wires. Photographs, diagrams, tables. 11 ref. (K4, Al)

627-K. (German.) **The Acetylene Processes.** H. von Hofe and H. Killing. *Schweissen und Schneiden,* v. 5, no.1, Jan. 1953, p. 4-12.

Welding and cutting processes and use of acetylene torch as a heat source. Individual processes and their present state of development. Photographs, graphs, diagrams, table. 27 ref. (K2, G22, Al, ST, Cu)

628-K. (German.) **Processes of Electric-Arc Welding.** K. L. Zeyen. *Schweissen und Schneiden,* v. 5, no. 1, Jan. 1953, p. 12-26.

Problem of increasing efficiency of manual process. Different types of electrodes and protecting gases. General review of automatic and semi-automatic methods. Photographs, graphs, diagrams, tables. 40 ref. (K1)

629-K. (German.) **Electric-Resistance Welding.** E. Hörmann. *Schweissen und Schneiden,* v. 5, no. 1, Jan. 1953, p. 26-41.

Uses and advantages of process and machines devised for its application. Photographs, diagrams, graphs, table. 21 ref. (K3)

630-K. (German.) **The "Thermit" Welding Process in Shipbuilding.** Wilhelm Ahlert. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 225-233.

Metallurgy of the process, repair of large parts of ships and constructional welding in shipbuilding. Tables, photographs, micrographs. (K4, ST)

631-K. (German, French.) **Blind Riveting.** Hans Bosshard. *Aluminium Suisse,* v. 3, no. 4, July 1953, p. 127-133.

Pop, Chobert and Avdel systems used in Switzerland. Tables, graphs, photographs, diagrams. (K13, Al)

632-K. (Russian.) **Electric Arc Welding of Copper.** D. A. Liukevich, S. I. German, and V. G. Kononenko. *Avtogennoe Delo,* v. 24, no. 2, Feb. 1953, p. 15-17.

Phosphor bronze rods with 8-10% Pb and 0.28-0.85% P gave very good results. Tables, photographs, micrographs. 3 ref. (K1, Cu)

633-K. (Spanish.) **Investigation on the Fatigue Resistance of Welded Joints as Compared to Screwed Joints.** F. Koenigsberger and Z. Garcia Martin. *Ciencia y técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 10 p.

Effect of alternating forces on the fatigue resistance of welded joints and factors which can reduce or eliminate this effect. Tables, diagrams. (K general, Q7, CN)

634-K. (Spanish.) **Proposed Classification of Weldability Tests.** H. Granjon. *Ciencia y técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 18 p.

Report of Committee No. 9 of the International Welding Inst. Purpose of investigation, tests, and proposes a preliminary classification. 5 ref. (K9)

635-K. (Book.) **The Behavior of Aluminium Alloy Riveted Joints.** A. J. Francis. Research Report No. 15. 96 p. 1953. Aluminium Development Association, 33 Grosvenor St., London W.1, England. 7s. 6d.

Reports on theoretical and practical investigations on the action of double shear riveted joints in Al under axial and eccentric loading in and beyond the elastic range. (K13, Q21, Al)

636-K. (Book.) **Bibliography of Resistance Welding.** Resistance Welder Manufacturers Association, 1900 Arch St., Philadelphia 3, Pa., RWMA Bulletin 17, 56 p. $1.25.

Articles on all phases of resistance welding published in U. S. since 1946. (K3)

637-K. (Book.) **Weldability of Steels.** Robert D. Stout and W. D'Orville Doty. 381 p. 1953. Welding Research Council, 29 West 39th St., New York, N. Y. $6.50.

Critical review of the available information on carbon and low-alloy steels. Results of research on weldability. (K9, ST)

L
Cleaning, Coating and Finishing

564-L. A Practical Manual of Hard Surfacing. Steve Elonka. *American Machinst,* v. 97, Aug. 17, 1953, p. 113-128.

Types of wear and influence of hardness. Techniques for hard facing including electric-arc, oxy-acetylene torch, spraying and paste applications. Photographs, diagrams. (L24, Q9)

565-L. Cast-Iron Pipe Coatings and Corrosion. John R. Baylis. *American Water Works Association, Journal,* v. 45, Aug. 1953, p. 807-831.

Corrosion of CI pipe coated with coal-tar. Diagrams, photographs, micrographs. (L26, R7, CI)

566-L. Heat Radiation Suppression. *Automobile Engineer,* v. 43, Aug. 1953, p. 323-324.

Measurement of the total emissivity of metal surfaces and refractory coatings, and the variation of emissivity with particle size and thickness of coating. Methods of bonding refractory coatings to metal surfaces; coating compositions and methods of application. Fatigue and other tests were made to determine the behavior of coatings under simulated service conditions. Graphs. (L27, P11, Q7)

567-L. Some Analyses on the Electro-Polished Surface. Fusao Hayama. *Castings Research Laboratory, Report,* no. 4, 1953, p. 52-54.

Compares luster of electropolished and mechanically finished surfaces. Graphs, table, diagram. (L13, L10, CN)

568-L. Obviates Need for Hydrofluoric Acid in Many Pickling, Etch-

ing Operations. *Chemical Processing,* v. 16. Sept. 1953, p. 34-49.
Use of "Actane 33" to replace HF. (L12)

569-L. Chlorine Gas and Molten Aluminum Resisted by Ceramic Coating. *Chemical Processing,* v. 16, Sept. 1953, p. 148-159.
Porcelain enameled steel pipe. (L27, CN)

570-L. Refractory Materials for the Vitreous-Enamelling Industry. R. J. Slawson and J. F. Clements. *Foundry Trade Journal,* v. 95, Aug. 6, 1953, p. 179-186.
Paper presented to the Institute of Vitreous Enamellers. How refractories are used, desirable properties required for each use, and suitable types. Photographs. (L27)

571-L. Finishing Rheem Water Heaters. James F. Vokral. *Industrial Finishing,* v. 29, Aug. 1953, p. 22-24, 27.
Enamelling process, including quality control of raw materials, cleaning of metal surfaces, spraying methods and baking. Photographs. (L27, CN)

572-L. New Machine Polishes Zinc Diecast Parts Automatically. Herbert Chase. *Iron Age,* v. 172, Aug. 20, 1953, p. 136-137.
Apparatus for polishing 2000 car door handles per hr. Photographs. (L10, Zn)

573-L. A Guide to the Painting of Aluminium Structures and Articles. W. A. Edwards. *Light Metals,* v. 16, Aug. 1953, p. 267-268.
Characteristics and properties of various coatings on Al. (L26, Al)

574-L. Shot Blasting. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, Aug. 1953, p. 68-70.
Process and equipment. Diagrams. (L10)

575-L. The Case for Tin-Nickel Alloy Plating. J. W. Cuthbertson. *Metal Industry,* v. 83, July 31, 1953, p. 89-91.
Problems in transferring the process from the laboratory to practice. Demonstrates practicability of the process and its advantages. Diagram. 3 ref. (L17, Sn, Ni)

576-L. Trends in Better Finishes for Automobiles. John Parina, Jr. *Metal Progress,* v. 64, July 1953, p. 83-86.
Use of Sn-Ni alloy, bright white brass, Sn-Cu, Sn-Zn, Cr, and Al. Electroplates, dip and organic coatings.
(L general, Sn, Ni, Cu, Zn, Cr, Al)

577-L. Process for Aluminum Plating From Nonaqueous Solution. Dwight E. Couch and Abner Brenner. *Metal Progress,* v. 64, July 1953, p. 126-128.
Previously abstracted from original in *Journal of the Electrochemical Society.* See item 592-L, 1952. (L17, Al)

578-L. Evaluation of Surfactants. Radiometric Evaluation of the Efficiencies of Various Surfactants in Displacing Water From Steel. J. E. Smallwood, and Stanley L. Eisler. *Soap and Sanitary Chemicals,* v. 29, Aug. 1953, p. 48-51, 101, 102.
Results are reported for 89 materials, using $Na_2S_2O_4$ as soiling agent. Data may help in evaluating water displacement powers of rust preventives. Tables. 3 ref. (L14)

579-L. Surface Finishing Stainless Steel. *Steel,* v. 133, Aug. 24, 1953, p. 82-83.
Buffing and polishing. Photographs, table. (L10, SS)

580-L. Hard Facing. H. O. Jones. *Welding Journal,* v. 32, Aug. 1953, p. 746.
Oxy-acetylene and arc hard-facing processes. Photographs. (L24)

581-L. Sandblasting and Annealing to Improve Flame-Cut High-Tensile Steel. A. Erker. *Welding Journal,* v. 32, Aug. 1953, p. 402S-412S.
Translated and condensed from *Schweissen und Schneiden.* See item 528-Q, 1953. (Q general, G22, Cr)

582-L. (German.) **Protection of Metal Surfaces.** A. Foulon. *Metalloberfläche,* Ausgabe A, v. 7, no. 7, July 1953, p. 109-110.
Advantages and disadvantages of different types of protective coatings on ferrous metals.
(L general, Fe)

583-L. (German.) **Anodic Oxidation and Pigmentation of Aluminum.** W. Philippi. *Metalloberfläche,* Ausgabe B, v. 5, no. 7, July 1953, p. 111-113.
Anodizing, tinting and polishing of Al parts and products. (L19, Al)

584-L. (Russian.) **Opaque Glazes for Sanitary Fixtures.** Z. A. Nosova, and M. E. Iakovleva. *Steklo i Keramika,* no. 3, Mar. 1953, p. 11-17.
Effects of different composition and firing temperatures on the quality of opaque glazes. Graphs, photographs, tables. (L27, CI)

585-L. Contact Immersion-Plating. J. K. Wilson and O. Wright. *Aircraft Production,* v. 15, Sept. 1953, p. 329-334.
Contact-tinning and compares product with electrotinning. Photographs, micrographs. 7 ref. (L16, L17)

586-L. Study of Some Phenomena Associated With the Adherence of Sheet Iron Ground Coats. R. F. Patrick, E. G. Porst, and G. H. Spencer-Strong. *American Ceramic Society, Journal,* v. 36, Sept. 1953, p. 305-313.
Deposition and adherence of Co and Ni on base metals during firing of sheet iron ground coats. Graphs, tables, micrographs. 11 ref. (L27)

587-L. Report of Committee B-8 on Electrodeposited Metallic Coatings. C. H. Sample, chairman. *American Society for Testing Materials.* Preprint no. 14, 1953, 25 p.
Recommendations for revision of specifications and report of subcommittee on performance tests. (L17, S22, Cu, Ni, Cr)

588-L. Automatic Controls for Surface Finishing Jet Engine Parts. R. J. Thomas. *Automotive Industries,* v. 109, Sept. 1, 1953, p. 48-50.
Finishing processes. Diagrams, photographs. (L general)

589-L. Development and Manufacture of Electroformed Conductor for Telephone Drop Wire. A. N. Gray and G. E. Murray. *Bell System Technical Journal,* v. 32, Sept. 1953, p. 1099-1135.
Plant for continuous plating of Cu on steel wire. Photographs, table. (L17, Cu, CN)

590-L. Vacuum Metallization for Surface Coating. *Canadian Metals,* v. 16, Sept. 1953, p. 42, 44.
Commercial applications of deposition of metals in vacuum. Many metals can be deposited on a variety of materials provided proper surfaces are prepared. (L25)

591-L. The Electrochemistry of the First Layers of Electrodeposited Metals. T. Mills and G. M. Willis. *Electrochemical Society, Journal,* v. 100, Oct. 1953, p. 452-458.
Variations in nature of binding of Pb to underlying Au and Ag studied by means of charging curves. Apparatus, technique, and experimental data. Diagram, graphs. 18 ref. (L17, Pb, Ag, Au)

592-L. Control of Electric Current and Related Variables in Plating and Anodising. *Electroplating and Metal Finishing,* v. 6, July 1953, p. 235-244; Aug. 1953, p. 285-289.
Basis and methods of control and plating rectifiers and generators. Factors involved in linking current control with control of other variables. Photographs, diagrams. (L17, L19)

593-L. Modern Industrial Rhodium Plating. R. Pinner. *Electroplating and Metal Finishing,* v. 6, Aug. 1953, p. 276-281.
Applications, preparation of solution, operating conditions, effect of impurities and equipment. Graphs, tables, photographs. 18 ref. (L17, Rh)

594-L. The Stripping of Plating Shop Rejects. C. D. Leonard. *Electroplating and Metal Finishing,* v. 6, Aug. 1953, p. 290-292, 296.
Recommended methods. (L12)

595-L. Production Plating of Aluminium and Its Alloys. Bernard E. Bunce. *Electroplating and Metal Finishing,* v. 6, Sept. 1953, p. 317-323.
Method using H_3PO_4 anodizing pretreatment. Recommendations for anodizing and plating solutions. (L19, L17, Al)

596-L. A Sound "Insurance Policy" for Pipe Protection. Wayne H. Schultz. *Gas,* v. 29, Sept. 1953, p. 113-114.
Advantages and application techniques of cold-applied coatings. Photographs. (L general)

597-L. Hot Spraying. Joseph A. Sanches. *Industrial Finishing,* v. 29, Sept. 1953, p. 52, 54, 56.
Alkyd and solvent-type finishes. (L26)

598-L. Difficult Galvanizing Jobs Done in New Radiant Furnace. Robert C. Boehnke. *Industrial Heating,* v. 20, Sept. 1953, p. 1702, 1704, 1706, 1842.
More uniform coatings on wide range of hot dipped products and valuable savings in dross formation, fuel consumption and maintenance have resulted from installation of new type radiant gas-fired galvanizing furnace. Photographs, diagram. (L16)

599-L. Automatic Paint Spray System Featured in Nash Motors Finishing Line. *Industrial Heating,* v. 20, Sept. 1953, p. 1776-1780, 1782, 1784-1788.
Spray booths used for finishing front-end assemblies. Photographs. (L26)

600-L. Chemical Cleaning of Boilers. Richard B. Conlan. *Industry and Power,* v. 65, Sept. 1953, p. 76-79.
Alkaline boil-out, acid cleaning, and "fill and soak" methods. Photographs, diagrams. (L12)

601-L. "Plastic Alloys" Provide Low Cost, Corrosion-Resistant Finish. W. G. Patton. *Iron Age,* v. 172, Sept. 10, 1953, p. 159-162.
Applications of vinyl plastisol coatings on metals. Photographs. (L26)

602-L. Better Tumbling Methods Cut Parts Finishing Costs. I. Wayne Stone. *Iron Age,* v. 172, Sept. 24, 1953, p. 117-121.
Photographs. (L10)

603-L. Maintenance Painting of Steel and Coke Oven Plants. S. C. Frye. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 83-88; disc., p. 88-89.
Types, methods, preparation of surfaces and problems in painting buildings and equipment to prevent corrosion. Photographs. (L26, R10)

604-L. Chromium Plating in Steel Plants. John B. Allen and Jerome D. Tulloch. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 90-94; disc., p. 94-97.
Use of Cr electroplating of machinery for corrosion prevention. Photographs. (L17, R10, Cr)

605-L. Infrared Offers Economies in Continuous Process Heating. I. J.

Barber. *Iron Age,* v. 172, Oct. 1, 1953, p. 97-101.

Advantages for drying and baking organic finishes. Typical installations. Photographs, charts. (L26)

606-L. Electrostatic Spray Method Primes Car Bodies. Herbert Chase. *Iron Age,* v. 172, Oct. 1, 1953, p. 102-103.

Equipment and advantages. Photographs. (L26)

607-L. Recent Developments in the Plating of Aluminium. *Light Metals,* v. 16, Sept. 1953, p. 311-313.

Describes and criticizes preferred techniques. Tables. 29 ref. (To be continued.) (L general, Al)

608-L. Designing Electroformed Parts. William H. Metzger, Jr. and Vernon A. Lamb. *Machine Design,* v. 25, Sept. 1953, p. 124-131.

Electroforming applications, types of mandrels, design factors and metal selection. Tables, diagrams, photographs. (L18)

609-L. New Developments. HAE Finish for Magnesium. H. A. Evangelides. *Magnesium,* v. Aug. 1953, p. 2-6.

Properties of HAE coating and test results. Coating can be applied to all Mg alloys. (L14, Mg)

610-L. New Plating Plant for Union Switch & Signal. *Metal Finishing,* v. 51, Sept. 1953, p. 61-64.

Plant layout and equipment. Photographs, diagram. (L17)

611-L. Inhibitors for Metal Finishing. R. O. Bailey. *Metal Finishing,* v. 51, Sept. 1953, p. 65-68.

Use of inhibitors in pickling baths. Photographs. (L12, ST)

612-L. Electroless Nickel. Harry J. West. *Metal Finishing,* v. 51, Sept. 1953, p. 68.

Production methods and results. (L16, Ni)

613-L. Protective Anodizing of Highly Reflective Aluminum. Sakae Tajima, Yasuyuki Kimura, and Toshiro Fukushima. *Metal Finishing,* v. 51, Sept. 1953, p. 69-73.

Brightening method, anodizing with various electrolytes, effects of current density and decrease of reflectivity with anodizing time. Photographs, graphs, tables. 9 ref. (L19, Al)

614-L. Plating Through a Slot. J. B. Mohler. *Metal Industry,* v. 83, Sept. 11, 1953, p. 219-222.

Method and advantages. Diagrams, tables. 9 ref. (L17)

615-L. Phosphate Coatings on Steel Surfaces. H. A. Holden. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 71-77, 90.

Different types of coatings and their applications in the fields of corrosion protection, wear prevention, and cold working lubrication. Micrographs, photographs. 19 ref. (L14, ST)

616-L. Plating Waste Treatment. C. F. Paulson. *Metal Progress,* v. 64, Aug. 1953, p. 84-87.

Recovery of electroplating wastes by using ion exchange processes. Photograph, table, diagram. (L17, A8)

617-L. Metal Finishing by High-Vacuum Metallization. George H. Bancroft. *Metal Progress,* v. 64, Sept. 1953, p. 87-90.

Details of process, including coating of object with lacquer, evaporation of metal in high vacuum, and coating with lacquer and baking. Photographs, diagram. (L25)

618-L. Organic Finishes Protect Silver. Floyd H. Meller and Irene Donnelly. *Organic Finishing,* v. 14, Aug. 1953, p. 16-18.

Types of lacquers and successful pretreatments. (L26, Ag)

619-L. Protective Coatings in Paper and Pulp Mills. R. R. Kelly. *Paper Mill News,* v. 76, Aug. 22, 1953, p. 116-117.

Use of plastic coatings. (L26)

620-L. Black Chromium-Base Electroplating. Martin F. Quaely. *Plating,* v. 40, Sept. 1953, p. 982-985; disc., p. 985-986.

Process of electrodeposition. Table. 13 ref. (L17, Cr)

621-L. Crack-Free Chromium From Baths of the Self-Regulating High-Speed Type. R. Dow and J. E. Stareck. *Plating,* v. 40, Sept. 1953, p. 987-995; disc., p. 995-996.

Structure of deposit, resistance to thermal stress, corrosion, hardness, buffing, leveling action, plating speed, effect of tensile loading and fatigue. Micrographs, tables. (L17, Cr)

622-L. Cost Determination in the Industrial Chromium Plating Job Shop. William F. Walton and Pierre B. Lonsbury. *Plating,* v. 40, Sept. 1953, p. 1001-1004; disc., p. 1004.

Tank-hour rate system, extra charges, price determination and paper work. (L17, Cr)

623-L. Stability of Ion Exchange Resins Toward Chromic Acid Plating Solutions. C. F. Paulson and G. H. Saunders. *Plating,* v. 40, Sept. 1953, p. 1005-1008; disc., p. 1008-1009.

Use of resins in anodizing and electroplating plants. Tables, graphs. (L17, L19, Cr)

624-L. Porosity of Electrodeposited Metals. XI. Analysis of Corrosion Products as a Method of Measuring the Change of Porosity in Corrosion. *Plating,* v. 40, Sept. 1953, p. 1011-1015.

Method by which the progress of corrosion can be determined as a function of time of exposure in objectively meaningful absolute units. Tables, graphs. (L17, R1, Fe, Ni)

625-L. Decomposition of Cyanides in Aqueous Solutions. W. R. Meyer, R. F. Muraca, and E. J. Serfass. *Plating,* v. 40, Oct. 1953, p. 1104-1109; disc., p. 1110.

Factors that cause decomposition. Data to evaluate magnitude of cyanide loss in plating solutions. Tables. (L17)

626-L. Evaluation of Carbonate Removal Methods. R. Scott Modjeska. *Plating,* v. 40, Oct. 1953, p. 1111-1114; disc., p. 1114.

Reviews and compares various methods for removal of carbonates from cyanide plating solutions. Table. 12 ref. (L17)

627-L. A Further Study on the Effect of Abrasive Metal Polishing on the Character of Nickel Plate. W. L. Pinner. *Plating,* v. 40, Oct. 1953, p. 1115-1118, 1123-1125; disc., p. 1125.

Surface imperfections in the base metal were shown to have a harmful effect on corrosion resistance and smoothness of Ni plated on steel. Micrographs, diagram. 2 ref. (L10, L17, Ni, CN)

628-L. Plating on Molybdenum. A. Korbelak. *Plating,* v. 40, Oct. 1953, p. 1126-1131; disc., p. 1131-1133.

Methods of plating various metals on Mo. Photographs, micrographs, tables. 11 ref. (L17, Mo)

629-L. Performance of Electrical Joints Utilizing New Silver Coating on Aluminum Conductors. T. J. Connor and W. R. Wilson. *Power Apparatus and Systems,* 1953, no. 7, Aug., p. 702-709; disc., p. 709-712.

Preparation and evaluation of Al joints which will meet standards of performance now being maintained in modern switchgear. Tables, graphs, photographs, diagrams. (L17, T1, Al, Ag)

630-L. The Formation of Hot Dipped Zinc Coatings. M. L. Hughes. *Product Finishing,* v. 6, Aug. 1953, p. 49-58.

Various factors affecting structure and properties of a galvanized coating. Micrographs. 22 ref. (L16, Zn)

631-L. Present Day Aircraft Finishes. R. H. Warring. *Product Finishing,* v. 6, Aug. 1953, p. 63-72, 116.

Appropriate specifications and ways of applying finishes for aircraft of all types. Tables, photographs. (L general, S22)

632-L. Priming and Pre-Treatment Advances. Degreasing Materials. *Product Finishing,* v. 6, Aug. 1953, p. 73-74.

Use of "Degresol" to remove grease, oil polishing rouge, and compo from surfaces of Al and Zn. Photograph. (L12, Zn, Al)

633-L. Copper Plating by Periodic Reverse Current. *Product Finishing,* v. 6, Aug. 1953, p. 80-84.

Processing details. Diagrams, photographs. (L17, Cu)

634-L. Tin Coatings Research. *Product Finishing,* v. 6, Aug. 1953, p. 89-91.

Sn-Ni and Sn-Zn plating, hot tinned coatings, and organotin compounds. Photographs. (L17, L16, Sn, Ni, Zn)

635-L. Automatic Plant for Electroplating. H. Silman. *Product Finishing,* v. 6, Sept. 1953, p. 48-60.

Advantages and disadvantages of automatic plants. Types of plants available and design considerations involved. Photographs. (L17, Cr, Ni)

636-L. Review of Degreasing Plant. *Product Finishing,* v. 6, Sept. 1953, p. 89-98.

British degreasing equipment and procedures. Photographs. (L12)

637-L. Antique Copper Finish for Modern Gas Ranges. Ezra A. Blount. *Products Finishing,* v. 17, Sept. 1953, p. 24-30, 32.

Plating Cu on steel range panels followed by a chemical treatment, spraying a clear enamel, and baking. Photographs. (L17, L26, Cu, CN)

638-L. How to Clean Zinc Base Die Castings Before Plating. A. T. Thibadeau. *Products Finishing,* v. 17, Sept. 1953, p. 68-70.

Procedure. (L12, Zn)

639-L. Practical Considerations Affecting the Fabrication and Mechanical Polishing of Stainless Steel Sheet. D. H. Lloyd. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 767-774, 784.

Mechanical properties, surface finish, heat treatment and finishing methods which necessitate modifications of normal techniques applied to mild steel. Graphs, photographs. (L10, G general, J general, SS)

640-L. The Electrochemical Manipulation of Stainless and High-Duty Alloys. P. A. Charlesworth and C. Hobson. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 825-832, 834, 837-838, 841.

Electropolishing process, plant requirements and commercial applications. Photographs, micrographs. (L13, Cu, CN, SS, Ni, Cr)

641-L. Galvanizing With a Paint Brush. *Steel,* v. 133, Sept. 7, 1953, p. 158.

Protection given by 93 to 95% metallic zinc paints. (L16)

642-L. Vacuum Metallizing as a Production Process. J. Gordon Seiter. *Tool Engineer,* v. 31, Sept. 1953, p. 49-53.

Typical metallized parts, vacuum process, properties of coatings, typical production unit and advantages. Diagrams, photographs. (L25)

643-L. Process Controls Key to Top Quality Enamel Finishing on Rheem Wedgewood Range. Fred M. Burt. *Western Metals,* v. 11, Sept. 1953, p. 68-70.

Photographs, diagram. (L27)

CHEMICALS ACP PROCESSES

PHOSPHATE COATINGS TO MAKE YOUR PRODUCT DURABLE*

PIONEERING RESEARCH AND DEVELOPMENT SINCE 1914

For more than a third of a century, ACP research chemists and ACP technical representatives in the field have pioneered in the science of metal preservation. They have developed surface treating chemicals which either protect metals directly, or create a superior bond for decorative and protective paint finishes, and now, ACP chemicals and processes are being used the world around to reduce costs, speed production and add to the life-span of countless products.

ACP metal protective chemicals include: protective coating chemicals for steel, zinc and aluminum; metal cleaners and rust removers; final rinse controls; pickling acid inhibitors; copper coating chemicals; soldering fluxes; alkali cleaners and addition agents; copper stripping and brightening solutions.

PAINT BONDING

"GRANODINE"® zinc phosphate coatings improve paint adhesion on automobiles, refrigerators, projectiles, rockets, and many other steel and iron fabricated units or components.

"LITHOFORM"® zinc phosphate coatings, make paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE"® protective coatings provide improved paint adhesion and high corrosion-resistance for aircraft and aircraft parts, awnings, wall tile, signs, bazookas, and many other products made of aluminum.

RUST PROOFING

"PERMADINE"® zinc phosphate coatings provide rust and corrosion proofing for nuts, bolts, screws, hardware, tools, guns, cartridge clips, and many other industrial and ordnance items.

PROTECTION FOR FRICTION SURFACES

"THERMOIL GRANODINE"® manganese-iron phosphate coatings provide both rust proofing and wear resistance — anti-galling, safe break-in, friction on rubbing parts.

IMPROVED DRAWING AND COLD FORMING

"GRANODRAW"® zinc phosphate coatings make possible improved drawing, cold forming and extrusion on such steel products as sheets for stamping, bumpers, parts to be formed, prior to plating or painting, cartridge cases, etc.

*Made, Sold, and Serviced By A Pioneer In Protective Coatings For Metals . . .

AMERICAN CHEMICAL PAINT COMPANY

General Offices: Ambler, Penna.

Detroit, Michigan — *Niles, California* — *Windsor, Ontario*

644-L. Latest Line Processing Equipment Installed by Incandescent Heat Co. Ltd. *Wire Industry,* v. 20, Sept. 1953, p. 877-878, 880.

Continuous stand patenting, cleaning and coating line for handling simultaneously high-carbon steel rods and drawn wire. Continuous annealing, cleaning and galvanizing line for wire. Photographs. (L general, J23, J25, CN)

645-L. (Czechoslovakian.) **Protection of Steel From High Temperature Effects.** R. Kopec. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 411-414.

Alloying elements and diffusion coating with Al and Cr. Diagrams, photographs, micrographs, graphs. 4 ref. (L15, ST, Al, Cr)

646-L. (French.) **Hot Tinning.** G. Haas. *Métallurgie et la construction mecanique,* v. 85, no. 7, July 1953, p. 571-573.

Techniques in the use of fluxes. (To be continued.) (L16, Sn)

647-L. (French.) **Chemical Polishing of Aluminum and Its Alloys.** Jean Hérenguel. *Revue de l'Aluminium,* v. 30, no. 201, July-Aug. 1953, p. 261-267.

Process using H_2SO_4, H_3PO_4 and HNO_3 formulae. Metallographic and industrial applications. Photomicrographs. 9 ref. (L12, M general, T general, Al)

648-L. (German.) **Application and Economy of Metallic Coatings.** H. W. Dettner. *Metall,* v. 7, nos. 13-14, July 1953, p. 552-554.

Economic advantages of the various methods of preparing such coatings. 1 ref. (L general)

649-L. (German.) **Surface Erosion During Chemical and Anodic Polishing of Reflectal and Pure Aluminum.** L. Koch and S. Keste. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 577-581.

Polishing of Al and Al-Mg alloys. Chemical process was effective for pure Al, but $Al_{12}SiFe_3$ crystallites caused disturbance in 99% pure Al. Photographs, table. 4 ref. (L12, L13, Al)

650-L. (German.) **The Influence of Flame-Cleaning on the Properties of Steels.** H. Kemper and W. Pomaska. *Schweissen und Schneiden,* v. 5, no. 6, June 1953, p. 201-209.

Various gases, dusts and vapors in flame-cleaning. Effects of the cleaning on the corrosion resistance of steels. Tables, graphs, diagrams, photographs, photomicrographs. 12 ref. (L10, R general, ST)

651-L. (German.) **The Electrolytic Deposition of Elements at the Mercury Electrode.** Rudolf Bock and Karl-Gerhard Hackstein. *Zeitschrift für analytische Chemie,* v. 138, no. 5, May 1953, p. 339-357.

Tests on a number of elements, the effect of H_2SO_4 concentration upon the completeness of the deposition and some control experiments. Tables, graphs. 25 ref. (L17, Hg, Cu, Zn, Cd, In, Tl, Sn, Bi, Fe)

652-L. Coatings for Underground Pipelines. W. A. James. *Chemistry in Canada,* v. 5, Sept. 1953, p. 175-178.

Photographs, table. 13 ref. (L26, R8)

653-L. Plastics vs. Corrosion. *Modern Plastics,* v. 31, Sept. 1953, p. 83-89, 176-179.

Use of plastics in pipes, tubes, fittings, tanks and ducts. Welding technique, cold casting, coatings and linings. Photographs. (L26, K general)

654-L. (German.) **Protective Action of Cement Against Rust.** Hans Hebberling. *Werkstoffe und Korrosion,* v. 4, no. 7, July 1953, p. 247-248.

Action and preparation of effective cement coatings. 5 ref. (L26)

655-L. (Book.) **Electrodeposition Research.** Proceedings of the NBS Semi-centennial Symposium on Electrodeposition Research Held at the NBS on Dec. 4-6, 1951, National Bureau of Standards Circular 529, 129 p. U. S. Government Printing Office, Washington 25, D. C. $1.50.

Papers cover research at various industrial, university and government laboratories in U. S. and Europe. (L17)

656-L. (Book—German.) **(Chemical and Galvanic Coatings. Surface Protection of Metals.) Chemische und Galvanische Uberzüge. Oberflächenschutz von Metallen.** H. Silman. 384 p. 1952. Verlag Chemie, G.m.p.h., Weinheim - Bergstrasse, Germany. 28.40 DM.

Condition and progress of the English and American electroplating industry in particular. (L general)

657-L. (Book—German.) **(Modern Electroplating.) Moderne Galvanotechnik.** Willy Machu. 560 p. 1953. Verlag Chemie, G.m.b.h., Weinheim-Bergstrasse, Germany. 40 DM.

Covers the whole field of electroplating. Chemical and mechanical pretreatment, grinding, polishing, degreasing, and pickling. (L general, L17)

M

Metallography, Constitution and Primary Structures

330-M. An Electron Diffraction Study of the Surfaces of Fe-Ni Binary System Alloys. Tadayuki Nakayama. *Castings Research Laboratory, Report,* no. 4, 1953, p. 66-67.

Graph, table. (M22, Fe, Ni)

331-M. Oxide Film on Nickel-Chromium Alloys. Crystal Structure Studies. Earl A. Gulbransen and William R. McMillan. *Industrial and Engineering Chemistry,* v. 45, Aug. 1953, p. 1734-1744.

Influence of composition and crystal structure on resistance to oxidation. Electron diffraction techniques used to study eight alloys containing Mn, Si, Fe, Zr, Ca, Mg, and Al. Photographs, diagrams, tables. 30 ref. (M26, R2, Ni, Mn, Cr, Si, Fe, Zr, Co, Mg, Al)

332-M. Mounting Metallurgical Specimens. P. A. Lovett. *Metal Industry,* v. 83, July 24, 1953, p. 70.

Procedure for cold curing plastic as mounting medium. (M21)

333-M. "Equilibrium Segregation" at Grain Boundaries. *Metal Industry,* v. 83, Aug. 21, 1953, p. 144.

Factors affecting equilibrium segregation. (M27)

334-M. (French.) **Development of a Submicroscopic Precipitation in Hardenable Nickel-Chrome Type 80-20 Alloys.** Yves Baillie and Jean Poulignier. *Comptes rendus,* v. 237, no. 2, July 15, 1953, p. 181-183.

Replica technique for use with the electron microscope to study precipitate formation in Ni-Cr alloys containing Al or Ti. Graphs, micrographs. 5 ref. (M21, Cr, Ni)

335-M. (German.) **An Imprint Method of Viewing Rough Surfaces Under the Electron Microscope.** Hermann Pfisterer. *Naturwissenschaften,* v. 40, no. 3, 1953, p. 106.

Method. Electron micrographs. 4 ref. (M21)

336-M. (German.) **Research on the Phase Structures of Cu_2Te, CuTe, Cu_3Sb, InTe, Bi_2Se_3, Pd_3Sb_2, and Pd_4Bi_3 Alloys.** K. Schubert, K. Anderko, M. Kluge, H. Beeskow, M. Ilschner, E. Dörre, and P. Esslinger. *Naturwissenschaften,* v. 40, no. 9, 1953, p. 269.

Brief review. 14 ref. (M26, Cu, Te, Sb, In, Bi, Se, Pb)

337-M. (German.) **Correlation of the Position of the Outer Electrons in the Chemistry of Crystals.** K. Schubert. *Naturwissenschaften,* v. 40, no. 9, 1953, p. 269-270.

Theoretical discussion. 5 ref. (M25, Fe, Ni, Al)

338-M. (German.) **Chromium Oxides Between Cr_2O_3 and CrO_3.** O. Glemser, U. Hauschild, and F. Trüpel. *Naturwissenschaften,* v. 40, no. 11, 1953, p. 317.

Experimental data. 7 ref. (M26, Cr)

339-M. How Crystal Structure Affects Metal Forming. Samuel Storchheim. *American Machinist,* v. 97, Sept. 28, 1953, p. 139-147.

Crystallography of metals and effects of deformation on the crystal structure. Diagrams, graphs. (M26, Q24)

340-M. Report of Committee E-4 on Metallography. L. L. Wyman, chairman. *American Society for Testing Materials,* Preprint no. 57, 1953, 28 p.

Activities of subcommittees and techniques for ferrous electron microscopy. Micrographs. (M21, Fe)

341-M. The Adaptation of an Electron Microscope for Reflexion and Some Observations on Image Formation. M. E. Haine and W. Hirst. *British Journal of Applied Physics,* v. 4, Aug. 1953, p. 239-244.

Based on a paper presented to a Conference of the Electron Microscope Group of the Institute of Physics, Bristol, September 1952. Modified mechanical stage arrangements which allow the type E.M.3 electron microscope to be used for the glancing angle "reflexion" technique. Diagrams, micrographs. 8 ref. (M21)

342-M. Structural Features of Oxide Coatings on Aluminum. F. Keller, M. S. Hunter, and D. L. Robinson. *Electrochemical Society, Journal,* v. 100, Sept. 1953, p. 411-419.

Investigations made with an electron microscope. Micrographs, graphs. 6 ref. (M21, L14, Al)

343-M. The Constitution of Aluminium-Copper-Silicon Alloys. H. W. L. Phillips. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 9-15.

Tables, graphs. 16 ref. (M24, Al, Cu, Si)

344-M. The Structure and Mechanical Properties of Copper-Manganese-Tin Alloys. J. C. Blade and J. W. Cuthbertson. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 17-24.

Tables, graphs. 14 ref. (M27, Q general, Cu, Mn, Sn)

345-M. The Behaviour of the Crystal Boundaries of Aluminium at Temperatures Near the Melting Point. W. I. Pumphrey and J. V. Lyons. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 33-37.

Tensile strength of high-purity Al was observed to drop sharply some 4° C. below melting point. Experimental techniques employed to determine reasons for phenomena. Graph, diagrams, table. 15 ref. (M27, Q23, Al)

346-M. The Re-Investigation of a Nickel-Titanium Alloy and Observations on $\beta/(\alpha+\beta)$ Boundaries in Titanium Systems. A. D. McQuillan. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 47-48.

9 references. (M24, Ni, Ti)

347-M. The Preparation in Sheet Form of Large Single Crystals of Silicon-Iron of Predetermined Orientation

for Magnetic Purposes. R. G. Martindale and D. A. Langford. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. 2, Aug. 1953, p. 417-424; disc., p. 424-426.

Preparation, apparatus and examination of the crystals. Diagrams, graphs. 36 ref. (M26, P16, Si, Fe)

348-M. Influence of Oxygen on the Properties of Iron and Steel. Taiichi Saito. *Japan Science Review, Engineering Sciences,* v. 2, Apr. 1952, p. 349-360.

Grain size and hardenability determined on samples having closely controlled C and O contents. Diagrams, micrographs, table. 10 ref. (M27, J26, CN)

349-M. Metallic Grating Replicas as Internal Standards for Calibrating Electron Microscopes. S. R. Rouze and John H. L. Watson. *Journal of Applied Physics,* v. 24, Sept. 1953, p. 1106-1109.

Advantages and limitations of all-metal replicas. Tables, photographs. (M21)

350-M. Crystallographic Angles for Orthorhombic (Alpha) Uranium. R. B. Russell. *Journal of Metals,* v. 5, sec. 2, Sept. 1953. *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1190.

Brief description. (M26, U)

351-M. Structure of the Phase TiMn and the Indexing of Powder Patterns of Sigma-Type Phases. R. P. Elliott and W. Rostoker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1203-1204.

Investigation. Tables. (M26, Ti, Mn)

352-M. The Ternary System Ti-Ta-C. John G. McMullin and John T. Norton. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1205-1208.

An 1820° C. isothermal cross section of the Ti-Ta-C ternary diagram was prepared from X-ray diffraction and metallographic data. Diagram. 13 ref. (M24, M21, Ti, Ta)

353-M. System Titanium-Chromium-Iron. R. J. Van Thyne, H. D. Kessler, and M. Hansen. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1209-1216.

Phase diagram of the Ti-rich portion of the system Ti-Cr-Fe to 70% Ti was established by means of isothermal sections at 900, 800, 750, 700, 650, 600, and 550° C., using arc-cast alloys. Diagrams, graphs, tables, micrographs. 14 ref. (M24, Ti, Cr, Fe)

354-M. Decay of Lattice Defects Frozen Into an Alloy by Quenching. A. E. Roswell and A. S. Nowick. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1259-1266.

How measurements of atomic mobility in a Ag-Zn substitutional solid solution make possible a study of the rate of decay of lattice defects frozen into the alloy by quenching. Graphs. 14 ref. (M26, Ag, Zn)

355-M. An Optical Goniometer for the Examination of Long Metal Single Crystals. A. J. Goss. *Journal of Scientific Instruments,* v. 30, Aug. 1953, p. 283-285.

Mechanical construction and optical arrangement. Method of determinating orientation from the etching pit reflection patterns. Practical information regarding etchants and crystallographic data. Diagrams. 13 ref. (M23)

356-M. Electron Diffraction. A. E. Williams. *Mechanical World and Engineering Record,* v. 133, Sept. 1953, p. 390-394.

Equipment and operation. Typical applications in minerals and metals. Photographs, diagrams. (M22)

357-M. Multiplicity in X-Ray Emission Spectra. I. B. Borovsky and T. M. Golovner. *National Science Foundation Translation,* no. NSF-tr-7, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 233.

Composition of complex X-ray spectra of rare earth elements. Tables. (M22, EG-g)

358-M. Certain Regularities in Nuclear Spin and a Nuclear Shell Model. I. A. Vaisman. *National Science Foundation Translation,* no. NSF-tr-16, May 1953, 8 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 237.

Compares Elsasser model with experimental values. Shell models, nuclear spins and orbital momenta for 93 elements. Table. (M25)

359-M. The Thermal Etching of Uranium. B. W. Mott and J. Williams. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 841-844.

Thermal etching characteristics of U with particular reference to the formation of steps on beads of metal produced by melting the powder. (M21, U)

360-M. The Valency of the Transition Metals in Some Binary and Ternary Alloys. H. Jones. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 907-912.

Changes of valency of transition metal atoms in different alloy systems is considered. Reasons for expecting the valency to decrease as conduction band increases. Rough agreement with the experimental results of Haworth and Hume-Rothery for Mn, Fe, and Co. Suggestions for apparent fractional valency of Ni. (M24, Mn, Fe, Co, Ni)

361-M. The Electronic Structure of Transition Metals in Alloys. B. R. Coles. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 915-916.

A review. (M25)

362-M. X-Ray Diffraction Proves Valuable Research and Production Tool to Evaluate Properties of Metals. Gustav Albrecht. *Western Metals,* v. 11, Sept. 1953, p. 74-76.

Complex crystal systems in alloys. Correlates fatigue with changes in these systems and follows microstructure modifications brought about in metals by heat treatment, work hardening and other physical processes. Photographs, diagrams, graphs. (M22)

363-M. (English.) On the System Manganese-Tellurium. S. Furberg. *Acta Chemica Scandinavica,* v. 7, no. 4, 1953, p. 693-694.

Results of X-ray studies. 7 ref. (M24, Mn, Te)

364-M. (French.) Existence of a Short Range Order in Solid Solutions. Study of Aluminum-Silver Alloys. Gérard Fournet. *Comptes rendus,* v. 237, no. 1, July 6, 1953, p. 75-77.

Theoretical predictions of X-ray diffraction intensity at various temperatures is in good agreement with experiments. Graph. (M26, Al, Ag)

365-M. (French.) Obtaining Electron Micrographs of Surfaces Bombarded by Ions. Albert Septier. *Comptes rendus,* v. 237, no. 3, July 20, 1953, p. 231-233.

Secondary emission of electrons used to obtain a very slightly enlarged electron picture. Diagrams, micrograph. (M21)

366-M. (French.) Micrographic Aspect of Polygonization in Uranium. Marcel L. Englander and Pierre A. Jacquet. *Comptes rendus,* v. 237, no. 3, July 20, 1953, p. 262-264.

Strictly controlled oxidation permitted detection of a substructure in some U grains after electrolytic polishing. Micrographs. 10 ref. (M27, U)

367-M. (French.) Electronic Diffraction Study of Vacuum Vaporization of Aluminum-Copper Alloys. Noboru Takahashi, Jean-Jacquets Trillat, and Adrien Saulnier. *Metaux, Corrosion—Industries,* v. 28, no. 333, May 1953, p. 185-202.

Method permits continuous recording of transformations produced under action of various factors. Tables, graphs, microphotographs, diagrams. 9 ref. (M22, Al, Cu)

368-M. (French.) Study of the Cold Working of Metals by X-Ray Microdiffraction. P. B. Hirsch. *Revue de métallurgie,* v. 50, no. 5, May 1953, p. 333-340.

Tables, graphs, diagrams, micrographs. 15 ref. (M22, Au, Cu, Fe, Al, Sn, Pb, Zn)

369-M. (French.) Observations on the Crystallographic Habit Plane of Martensite. Robert F. Mehl and D. M. van Winkle. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 465-475.

Relations between the orientation of martensite and austenite. Tables, graphs, micrographs. 11 ref. (M26, AY)

370-M. (German.) Measurement of Ideal Crystal Lattices. Adolf G. Smekal. *Acta Physica Austriaca,* v. 7, no. 3, July 1953, p. 324-333.

Highly symmetrical substances of sufficient purity possess measurable ideal lattice areas. Photographs. 26 ref. (M26)

371-M. (German.) Structure of Amorphous Antimony. H. Richter and G. Breitling. *Naturwissenschaften,* v. 40, no. 13, 1953, p. 361-362.

Study of lattice-type layering and chain structure of amorphous Sb. Graphs. (M26, Sb)

372-M. (German.) Crystal Structure of Pd_2Si, Pd_2Ge, and Pt_2Ge. Kurt Anderko and Konrad Schubert. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 307-312.

Structures were found to be of the Fe_2P(C22) type. Assumptions regarding an electron lattice of low-potential energy and composed of hexagonal layers are based on local correlation of valence electrons. Diagrams, graphs, tables. 24 ref. (M26, Pd, Pt, Si, Ge)

373-M. (German.) Gold-Manganese Alloys. Ernst Raub, Ulrich Zwicker and H. Baur. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 312-319.

Phase diagram for Au-Mn based on thermal, microscopic, X-ray and dilatometric tests. Photographs, graphs, tables. 5 ref. (M24, Au, Mn)

374-M. (German.) MicroAutoradiography as an Agent for Materials Testing. II. Joachim Rasch. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 321-322.

Use to establish phase relations in alloys. Photographs. 2 ref. (M23, Au, Pt)

375-M. (German.) The Tin-Bismuth-Antimony System. Rudolf Vogel. *Zeitschrift fur Metallkunde,* v. 44, no. 7, July 1953, p. 323-324.

Survey of structure. Graphs. (M24, Sn, Bi, Sb)

376-M. (German.) Reflection Spectra of Powders. Gustav Kortüm and Peter Haug. *Zeitschrift für Naturforschung,* v. 8a, no. 6, June 1953, p. 372-379.

Validity range of Lambert's cosine law, polarization of diffused radiation, utility of different comparison standards and effect of grain size on the spectra in diffused radiation. Graphs. 19 ref. (M22)

377-M. (Italian.) **Knoop Microhardness Measurements on Some Structural Constituents of Aluminum Alloys.** D. Gualandi and M. Paganelli. *Alluminio,* v. 22, no. 2, 1953, p. 152-165.

Studies of the influence on microhardness exercised by the state of sample surfaces and by the direction of the crystallographic axes of the constituents. Tables, graphs, micrographs. 23 ref. (M26, Q29, Al)

378-M. (Italian.) **The Preparation of Tin Mono-Crystals and Determination of Their Crystallographic Orientation.** G. Bolognesi. *Metallurgia italiana,* v. 45, no. 6, June 1953, p. 208-211.

A method for preparation of white Sn monocrystals. A bath for the electrolytic polishing of Sn and an electrolytic bath for micrographic etching are described. Diagrams, micrographs. 9 ref. (M21, Sn)

379-M. (Russian.) **Theory of Healing Cracks in Crystals and the Equilibrium Form of the Negative Crystal.** G. G. Lemmlein. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 283-286.

Energy properties of large and small crystals compared. Graph. 8 ref. (M26)

380-M. Measurement of Approximately Cylindrical Particles in Opaque Samples. Robert L. Fullman. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1267-1268.

Relationships between average dimensions measured on a polished cross section and spatial dimensions of particles dispersed as uniform cylinders. Establishes equations for quantitative investigation of microstructures. (M27)

381-M. Thermal Fatigue of Single Crystals of Aluminum. V. I. Arkharov, S. I. Ignatyeva, and Yu. D. Kozmanov. *National Science Foundation Translation,* no. NSF-tr-3, June 1953, 2 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 439.

X-ray manifestations of these phenomena indicate the mosaic structure of the monocrystal. (M26, Al)

382-M. Mobility of Interstitial Atoms in a Face-Centered Metal. H. B. Huntington. *Physical Review,* v. 91, ser. 2, Sept. 1, 1953, p. 1092-1098.

Exponential closed-shell repulsion, electrostatic terms and variation of the electron distribution. Tables, diagram, graph. (M25, Cu)

383-M. (Book.) **Standard X-Ray Diffraction Powder Patterns.** Circular 539. v. I. Howard E. Swanson and Eleanor Tatge. v. II. Howard E. Swanson and Ruth K. Fuyat. 160 p. 1953. U. S. Government Printing Office, Washington 25, D. C. $.90.

Presents patterns made recently for 84 inorganic substances at National Bureau of Standards. Compares the patterns with those found in the ASTM file and in the literature, and recommends them for adoption as standard. (M22)

384-M. (Book.) **The Theory of Metals.** A. H. Wilson. Rev. ed. 2. 352 p. Cambridge University Press, 32 East 57th St., New York 22, N. Y. $8.50.

Discusses the motion of an electron in a perfect crystal lattice; metallic structures; structure of alloys; semi-conductors; thermal and magnetic properties of metals; ferromagnetism; formal theory of conduction; mechanism of conductivity; and application of the variation principle to conduction phenomena. (M26, M27, P11, P15, P16)

N

Transformations and Resulting Structures

246-N. A Theory of Globular Graphite Formation in Cast Iron. II. Ichiro Iitaka. *Castings Research Laboratory, Report,* no. 4, 1953, p. 4-6.

Experimental evidence. Photomicrographs. (N8, E25, CI)

247-N. The Effect of Alloying Elements on the Graphitization of White Iron Containing Small Per Cent of Chromium. Nobuhisa Tsutsumi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 23-26.

Tables, graphs. (N8, CI)

248-N. On the Transformation of Steel by Rapid Heating. III. On the Eutectoid Transformation. Kiyoshi Yokota and Nobuhiro Iguchi. *Castings Research Laboratory, Report,* no. 4, 1953, p. 33-35.

Studies were made on effect of heating rates (7 to 500° C per sec.) on the eutectoid transformation of steels. 7 ref. (N8, ST)

249-N. A Tentative Theory of Metallic Whisker Growth. J. D. Eshelby. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 755-756.

Dislocations, surface tension and chemical reaction with the atmosphere are used to explain phenomenon. (N2)

250-N. Effect of Prestraining on Recrystallization Temperature and Mechanical Properties of Commercial, Sintered, Wrought Molybdenum. Kenneth C. Dike and Roger A. Long. *National Advisory Committee for Aeronautics,* Technical Note 2973, July 1953, 25 p.

Investigation of the feasibility of raising recrystallization temperature of commercial Mo by limiting the amount of prestraining without sacrificing strength or ductility. Graphs, tables, micrographs. (N5, Q23, Mo)

251-N. (French.) **Light Phenomenon in the Investigation of Aluminum Alloys.** Christiane Changarnier and Jean Calvet. *Comptes rendus,* v. 237, no. 2, July 15, 1953, p. 179-181.

Age hardening of 6% Cu, 0.25% Mn, 0.12% Ti alloy prepared from pure metals. (N7, Al)

252-N. (German.) **Relationship Between the Partial and the General Diffusion Coefficients in Metallic Solid Solutions.** Theo. Heumann. *Naturwissenschaften,* v. 40, no. 5, p. 164.

Critically discusses computations. Tables. 16 ref. (N1, Ag, Au, Zn, Cu, Ni)

253-N. Factors Affecting the Transformation to Gray Tin at Low Temperatures. R. R. Rogers and J. F. Fydell. *Electrochemical Society, Journal,* v. 100, Sept. 1953, p. 383-387.

Effect of composition and thickness of Sn, temperature at which transformation takes place and history of Sn prior to transformation. Tables, photographs. 5 ref. (N6)

254-N. Growth Characteristics of Ingot-Mould Irons in Air and Vacuum. J. W. Grant. *Foundry Trade Journal,* v. 95, Sept. 3, 1953, p. 281-287; Sept. 10, 1953, p. 321-331.

Theories of growth of cast iron, including oxidation and cracking. Oxidation and growth at sub-critical temperatures, repeated heating in vacuum, effect of oxidation on the formation and decomposition of austenite, and repeated heating in air. Tables, graphs, micrographs. (To be continued.) 19 ref. (N8, CI)

255-N. Subgrain Formation in High-Purity Aluminum During Creep at High Temperatures. Andre M. Gervais, John T. Norton, and Nicholas J. Grant. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1166-1174.

Creep deformation of coarse-grained high-purity Al at temperatures approaching the melting point permitted the fromulation of a theory of subgrain formation. 34 ref. (N3, Q3, Al)

256-N. Recovery in Single Crystals of Zinc. R. Drouard, J. Washburn, and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1226-1229.

Investigation of temperature dependence of the rate of recovery in Zn single crystals after a simple shear deformation at low temperature. Tentative suggestions regarding annealed and strain-hardened states. Diagrams, graphs. (N4, Zn)

257-N. Orientation Relationships in the Recrystallization of Deformed Copper Single Crystals. J. J. Becker and J. N. Hobstetter. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1235-1238.

Deformed Cu single crystals exhibited, after annealing, either a recrystallized twinned grain with a twin plane parallel to an active deformation plane rotated approximately 22° about its pole, or else did not recrystallize at all. Micrographs, diagrams. (N5, Cu)

258-N. Rate of Propagation of Martensite. R. F. Bunshah and R. R. Mehl. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1251-1258.

Fast amplifier technique developed for measurement of the above in an Fe-29.5% Ni alloy. Diagrams, graphs. 19 ref. (N8, Fe)

259-N. Migration of Cr and C in a Weld in Type 502. M. A. Scheil. *Metal Progress,* v. 64, Sept. 1953, p. 108, 110.

Abnormalities in 4 to 6% Cr steel welded with 25-20 Cr-Ni electrode, heated at 1290° F. for 10,000 hr. Micrographs, table. (N1, SS)

260-N. The Dependence of the Diffusion Coefficient on Atomic Interaction in Metals and Alloys. I. Ya. Dekhtyar. *National Science Foundation Translation,* no. NSF-tr-25, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 49.

Not only the energy of activation of diffusion but also the diffusion coefficient are determined by nature and magnitude of interatomic bonds. (N1, Cu, Ag, Au, Pb, Co, Fe, W, Zn, Sn, Al, Ni, Mn)

261-N. On the Theory of Decomposition of Supersaturated Solutions. I. V. Salli. *National Science Foundation Translation* no. NSF-tr-24, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 61.

Variations in crystal growth rate causing different formations of structure. Diagrams, graph. (N12, Al, Fe)

262-N. On Tin Whiskers. F. C. Frank. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 854-860.

Theory of whisker growth. (N12, Sn)

263-N. Studies of Continuous Phase Transformations With X-Rays. E. Gillam and D. G. Cole. *Philosophical Magazine,* v. 44, 7th ser., no. 356, Sept. 1953, p. 999-1010.

Principle and application of meth-

od, apparatus, specimen treatment and accuracy. Graphs, tables, diagram. 14 ref. (N6, ST)

264-N. (English.) **The Growth of Platinum Crystals Out of $PtCl_4$.** E. Votava. *Naturwissenschaften,* v. 40, no. 16, 1953, p. 437-438.

Using plastic cover plates instead of muscovite, crystals were obtained with visible growth layers. Micrographs. 4 ref. (N12, Pt)

265-N. (English.) **Influence of Volume Changes and Lattice Vibrations in Order-Disorder Transitions.** L. Saroléa. *Physica,* v. 19, no. 7, July 1953, p. 615-626.

Alloys with two equivalent and nonequivalent sublattices. Graph. 14 ref. (N10, Cu)

266-N. (French.) **Carbides Formed During Tempering of Martensite.** Jacques Pomey and Raymond Coudray. *Comptes rendus,* v. 237, no. 1, July 6, 1953, p. 62-64.

Formation of unstable epsilon phase, considerably more stable zeta phase, and transformation into cementite. Graph. (N8, Fe)

267-N. (French.) **Researches on Heat Resistant Austenitic Alloys Having a Low Content of Scarce Metals.** W. Siegfried and F. Eisermann. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 485-492; disc., p. 492-494.

Limits of recrystallization and of recovery and hardness tests on 13% Cr alloys containing additions of Mo, W, V, Cb and on austenitic alloys. Tables, graphs, photographs. (N4, N5, Q29, Cr)

268-N. (French.) **Thermo-Elastic Analysis of Transformations in Metallic Alloys.** R. Cabarat, P. Gence, L. Guillet, and R. Le Roux. *Revue de métallurgie,* v. 50, no. 7, July 1953, p. 495-499.

Effect of allotropic transformation on the internal friction of alloys. Graphs. 12 ref. (N6, Q22, Al, Be)

269-N. (German.) **Reaction Velocity of Metallic Phases in the Range of Allotropic Modifications.** F. Erdmann-Jesnitzer and L. Marx. *Metall,* v. 7, nos. 13-14, July 1953, p. 499-501.

Hedvall's Law, the reaction of solids with gases when modificational changes occur, reaction velocity of alpha-gamma change of Fe for Fe-Al system, and results of measurements. Graphs. 11 ref. (N6, Fe)

270-N. (German.) **The Condensation of Metal Vapors on Hot Surfaces.** W. Opitz. *Zeitschrift für Physik,* v. 135, no. 1, 1953, p. 1-12.

Condensation temperatures were determined for a number of high-boiling metals, and condensation curves compared with thermodynamic saturation pressure curves. Tables, graphs. (N16, Ag, Sn, Mn, Al, Cr, Cu, Au, Pb, Ge, In, Ga, Be, Bi, W)

271-N. (Italian.) **On the Determination of Temperature-Time-Transformation Curves.** M. Casadio. *Metallurgia italiana,* v. 45, no. 5, May 1953, p. 163-165.

Use of hot-hardness tests to determine isothermal transformation of austenite. Microphotographs. 4 ref. (N8, Q29, Fe)

272-N. (Russian.) **Problem of Frontal Diffusion in Commercial Iron.** V. I. Arkharov, K. A. Efremova, S. I. Ivanovskaia, A. K. Shtol'ts, and B. A. Iunikov. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 269-270.

Diffusion of Ni, Pd, Cu and Cr in commercial Fe. 6 ref. (N1, Ni, Pd, Cu, Cr, Fe)

273-N. (Russian.) **Heterogeneity of Austenite.** I. A. Oding and M. G. Lozinskii. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 275-278.

Important factors in the development of heterogeneity in the structure of austenite grains in steel. Graph, diagram, micrographs. 8 ref. (N8, ST)

P
Physical Properties and Test Methods

454-P. Heat Transfer to Molten Lead-Bismuth Eutectic in Turbulent Pipe Flow. H. A. Johnson, J. P. Hartnett, and W. J. Clabaugh. *ASME, Transactions,* v. 75, Aug. 1953, p. 1191-1198.

Evaluation of experimental results and comparison of results with other available liquid-metal heat-transfer data. Graphs, tables, diagrams. 18 ref. (P12, Pb, Bi)

455-P. Electrical Properties of Liquid Selenium I. H. W. Henkels and J. Maczuk. *Journal of Applied Physics,* v. 24, Aug. 1953, p. 1056-1060.

Thermo-electric power of liquid Se was measured from 250 to 500° C. Values of activation energies calculated from temperature dependences of thermo-electric powers and resistivities agree. Diagram, graphs. (P15, Se)

456-P. Effect of Cold Work and Anneal on Resistivity of Alpha Brass. Herbert I. Fusfeld. *Journal of Applied Physics,* v. 24, Aug. 1953, p. 1062-1063.

Compares results with those of Masima and Sachs. (P15, J23, Q24, Cu)

457-P. The Surface Tension of Liquid Silicon and Germanium. Paul H. Keck and Wendell Van Horn. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 512-513.

Paper presented at the American Physical Society meeting at Durham, N. C., Mar. 26-28, 1953. Surface tensions were determined by using the drop weight method. (P10, Si, Ge)

458-P. *n*-Type Surface Conductivity on *p*-Type Germanium. W. L. Brown. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 518-527.

Results of some experimental and theoretical investigations pertaining to surface conductivity. Graphs, diagrams. (P15, Ge)

459-P. Evaporation of Copper From Germanium. George Finn. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 754-755.

Vacuum heat treating introduced fewer acceptors in Ge than heat treating in He atmosphere. (P15, Ge, Cu)

460-P. Oxygen-Induced Surface Conductivity on Germanium. Edward N. Clarke. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 756-757.

Gas adsorption and resulting surface electrical conductance at 197° K. Graphs. (P15, Ge)

461-P. Thermally Induced Acceptors in Single Crystal Germanium. R. A. Logan. *Physical Review,* v. 91, ser. 2, Aug. 1, 1953, p. 757-758.

Experimental procedure. (P15, Ge)

462-P. The Barkhausen Effect in Single Crystals. R. S. Tebble and V. L. Newhouse. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 633-641.

Experimental data and theoretical explanations for Si-Fe and Ni specimens. Graphs, table. 10 ref. (P16, Si, Fe, Ni)

463-P. Thermoelectric Effects Due to Stationary and Moving Asymmetrical Temperature Gradients in Mercury. N. Fuschillo. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 649-653.

Experimental data compared with earlier work on Cu and Pt. Diagrams. 10 ref. (P15, Hg, Cu, Pt)

464-P. Ferromagnetic Domain Processes in Single Crystal Disc Specimens of Silicon Iron. D. H. Martin. *Physical Society, Proceedings,* v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 712-714.

Importance of surface imperfections. Diagrams. 4 ref. (P16, Fe)

465-P. Sonic Barrier Raises Heat Barrier on Metals. Allen G. Gray. *Steel,* v. 133, Aug. 31, 1953, p. 72-74.

Problems of rising skin temperatures in aircraft at high speeds. Photographs, graphs. (P12)

466-P. (German.) **The Heating of Metal Surfaces by Friction.** Wilhelm Späth. *Metalloberfläche,* Ausgabe A, v. 7, no. 7, July 1953, p. 104-109.

Tests made with bars of Ga, Wood's metal and Pb by constant rubbing against a rotating steel disk. Cutting and wire-drawing operations and the Seebeck and Peltier effects. Diagrams, graphs. 10 ref. (P12, F28, Q9, Ga, Pb, ST, SG-d)

467-P. (German.) **The Semiconducting Properties of the Systems Potassium-Antimony, Cesium-Antimony, Potassium-Indium, and Cesium-Indium.** R. Suhrmann, and Cl. Kangro. *Naturwissenschaften,* v. 40, no. 4, 1953, p. 137-138.

Experimental results. Graphs, table. 4 ref. (P15, K, Sb, Cs, In)

468-P. (German.) **The Deformation of Germanium Surfaces.** Reiner Thedieck. *Zeitschrift für angewandte Physik,* v. 5, no. 5, May 1953, p. 163-165.

Improvement of the rectifying properties of Ge point contacts by deforming the surface with a depression or series of depressions. The phenomenon is explained by the formation of "holes" in the crystal lattice. Diagram, micrographs. 13 ref. (P15, Q24, Ge)

469-P. (German.) **The Mechanism of Point Contact Transistors.** Reiner Thedieck. *Zeitschrift für angewandte Physik,* v. 5, no. 5, May 1953, p. 165-166.

Effect of deformation on the rectifying properties of Ge crystals can be eliminated by etching the deformed area. Diagrams, graphs, micrographs. 5 ref. (P15, Q24)

470-P. Equilibrium of Solid α-Silver-Zinc Alloys With Zinc Vapor. George Scatchard and Roy A. Westlund, Jr. *American Chemical Society, Journal,* v. 75, Sept. 5, 1953, p. 4189-4193.

Studied by examination of spectra at 3076 A. under 1 mm. pressure. Alloys contained 0 to 30% Zn. Diagram, graphs, tables. 10 ref. (P12, Ag, Zn)

471-P. Cp-Cv in Silicon and Germanium. M. E. Fine. *Journal of Chemical Physics,* v. 21, Aug. 1953, p. 1427.

Experimental data. Values do not agree with those estimated by the Nernst-Lindemann relation. Graph. 8 ref. (P15, Si, Ge)

472-P. Solution of Metals in Fused Salts. Daniel Cubicciotti. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1106-1108.

Measurements of solubilities of some metals in their fused halides and effect of added salts on these solubilities. A structural model for the solution of metal in salts is presented to explain experimental data. Graphs. (P13)

473-P. Reaction of Silver With Aqueous Solutions of Cyanide and Oxygen. G. A. Deitz and J. Halpern. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1109-1116.

The kinetics of dissolution of Ag in cyanide solutions under O_2 pressure were investigated over a wide range of conditions establishing reactions involved and factors which influence the rate. Thermodynamic features of the reaction with particular reference to the influence of pH and CN. Graphs. 19 ref. (P12, Ag)

474-P. Electrical Resistivity of Liquid Metals and of Dilute Liquid Metallic Solutions. E. Scala and W. D. Robertson. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1141-1147.

Electrical resistivity of some pure liquid metals and alloys measured as a function of temperature and composition. Data show close correspondence between liquid and solid states with respect to thermal, structural and compositional relationships. Diagrams, graphs. 15 ref. (P15)

475-P. Thermal Conductivity, Electrical Resistivity, and Thermoelectric Power of Uranium. W. W. Tyler, A. C. Wilson, Jr., and G. J. Wolga. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1238-1239.

Experimental results. (P11, P15, U)

476-P. Resistance-Independent Absorption of Light Waves by Metals, and the Properties of Ideal Conductors. J. Lindhard. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 916-919.

Theory of optical properties of metals developed by Zener and Kronig. (P17)

477-P. Neutralization of Ions and Ionization of Atoms Near Metal Surfaces. L. J. Varnerin, Jr. *Physical Review,* v. 91, ser. 2, Aug. 15, 1953, p. 859-863.

Conditions for the resonance transfer of an electron between a metal and an ion or atom in close proximity to the surface. Graphs, diagram. 6 ref. (P15)

478-P. Excitation Functions for Proton-Induced Reactions With Copper. J. W. Meadows. *Physical Review,* v. 91, ser. 2, Aug. 15, 1953, p. 885-889.

Method to study cross section for formation of various isotopes of Cu and Zn as a function of energy. Graphs, tables. 13 ref. (P13, Cu, Zn)

479-P. The Electronic and Lattice Specific Heats in W, Mo, and Re. M. Horowitz and J. G. Daunt. *Physical Review,* v. 91, ser. 2, Sept. 1, 1953, p. 1099-1106.

Calorimetric measurements made in temperature range 1 to 77° K. Tables, graphs. 44 ref. (P12, W, Mo, Re)

480-P. Radiation Characteristics of Metals. Joseph Poggie. *Product Engineering,* v. 24, Sept. 1953, p. 205, 207.

Relative effects of surface texture and composition on emissivity of various metals at elevated temperature. Graphs. (P17)

481-P. Theoretical Resistivity and Hall Coefficient of Impure Germanium Near Room Temperature. P. G. Herkart and J. Kurshan. *RCA Review,* v. 14, Sept. 1953, p. 427-440.

Calculated values to aid in determining impurity contents of unknown samples. Graphs. (P15, Ge)

482-P. The Thermal Expansion of Anisotropic Metals. B. G. Childs. *Reviews of Modern Physics,* v. 25, July 1953, p. 665-670.

Variation with temperature of thermal expansion of anistropic metals. Theoretical significance of experimental data. Graphs, table. 36 ref. (P11)

483-P. The Spontaneous Magnetization of Alloys. I. Copper Nickel Alloys. D. J. Oliver and W. Sucksmith. *Royal Society, Proceedings,* v. 219, ser. A, Aug. 11, 1953, p. 1-17.

Initial stage of a project to determine temperature variation of spontaneous magnetization for a number of ferromagnetics. Graphs. 20 ref. (P16, Cu, Ni)

484-P. (French.) Metallic Dysprosium and Its Magnetic Properties. F. Trombe. *Journal des recherches du centre national de la recherche scientifique,* 1953, no. 23, June, p. 61-69.

Physical properties of rare-earth metals in general. Paramagnetic and ferromagnetic properties of Dy vary with temperature. Diagrams, graphs. 31 ref. (P16, Dy, EG-g)

485-P. (French.) Irregular Expansion of the Rare Earth Ferromagnetic Metals Gadolinium and Dysprosium. F. Trombe and M. Foex. *Journal des recherches du centre national de la recherche scientifique,* 1953, no. 23, June, p. 71-75.

Behavior of Gd and Dy at and above the Curie point. Graphs. 13 ref. (P16, Gd, Dy)

486-P. (German.) Coercive Force of Magnets Pressed From Ultrafine Iron-Cobalt Powder. F. Lihl. *Acta Physica Austriaca,* v. 7, no. 3, July 1953, p. 239-247.

Dependence of coercive force, residual magnetism and magnetizing force on Co content of magnets produced by reducing Fe compounds. Earlier data confirmed. Graphs, tables. 6 ref. (P16, H10, Co, Fe)

487-P. (German.) Vapor Pressure of Liquid Titanium Tetrachloride. Harald Schafer and Friedrich Zeppernick. *Zeitschrift für anorganische und allgemeine Chemie,* v. 272, nos. 5-6, July 1953, p. 274-278.

Static measurements of pressure and boiling point. Tables, graph, diagram. 4 ref. (P12, Ti)

488-P. (German.) Chemical Properties of Gold. Ernst Raub and Annemarie Engel. *Zeitschrift für Metallkunde,* v. 44, no. 7, July 1953, p. 298-301.

Reactions of gold alloys with S, S compounds and H_2O_2-containing NaCl solution. Graphs. 2 ref. (P13, Au)

Mechanical Properties and Test Methods; Deformation

833-Q. Stress Measurements and Service Tests of Manganese Steel Castings in the Crossings at McCook, Ill. *American Railway Engineering Association, Bulletin,* v. 55, no. 509, June-July 1953, p. 1-36.

Results of stress measurements for two new designs of castings and service tests of all castings. Diagrams, photographs, graphs. (Q25, CI)

834-Q. Investigation of Dead-Load and Live-Load Stresses in a 350-Ft. Truss Span on the AT&SF System. *American Railway Engineering Association, Bulletin,* v. 55, no. 509, June-July 1953, p. 37-132.

Tables, diagrams, graphs. (Q25, CN)

835-Q. Thermal Shock and Other Comparison Tests of Austenitic and Ferritic Steels for Main Steam Piping. A Summary Report. W. C. Stewart and W. G. Schreitz. *ASME Transactions,* v. 75, Aug. 1953, p. 1051-1067; disc., p. 1068-1072.

Thermal shock and mock-up tests. High temperature mechanical properties. Graphs, diagrams, tables, photographs. 8 ref. (Q general, SS)

836-Q. On the Validity of Assumptions Made in Theories of Plastic Flow for Metals. Joseph Marin and L. W. Hu. *ASME, Transactions,* v. 75, Aug. 1953, p. 1181-1186; disc., p. 1186-1190.

Results of a series of special biaxial-stress tests. Stresses were introduced in a tubular specimen by applying internal pressure and axial tension. Hot rolled 14S-T6 was tested. Diagrams, graphs, photograph. 5 ref. (Q24, Al)

837-Q. Research on the Aluminium-Silicon-Zinc System Alloys for Castings. Shigeo Oya. *Castings Research Laboratory, Report,* no. 4, 1953, p. 27-29.

Mechanical properties of the Al alloys in the range of 4-25% Zn and 0.20% Si contents. (Q general, Al)

838-Q. Etching Method for the Fatigue of Mild Steel. II. Hiroshi Yamanouchi and Takeshi Inukai. *Castings Research Laboratory, Report,* no. 4, 1953, p. 50-51.

Phenomena of fatigue. Research on change of mechanical properties in fatigue tests. Graphs. (Q7)

839-Q. Wear Resistance Property of Chromized Low Carbon Steel. Shigetomo Ueda. *Castings Research Laboratory, Report,* no. 4, 1953, p. 55-57.

Photograph, diagrams, graphs, table. (Q9, CN)

840-Q. Study on Young's Modulus (E) of Non-Ferrous Metals and Alloys. I. Ichiro Iitaka and Toshimasa Morooka. *Castings Research Laboratory, Report,* no. 4, 1953, p. 58-59.

Values for brasses in cold worked and heat treated states. Graphs, tables, photograph. (Q21, Cu)

841-Q. Some Problems in Flexural Testing. F. A. Blakey. *Engineer,* v. 196, July 24, 1953, p. 98-100.

Analysis relating to possible errors caused by lack of conformity of behavior of the testing apparatus with assumptions made about it. Graphs. 5 ref. (Q5)

842-Q. The Stability and Strength of Thin-Walled Steel Struts. A. H. Chilver. *Engineer,* v. 196, Aug. 7, 1953, p. 180-183.

Compression strength of steel channel sections. Photographs, graphs, diagrams, tables. 7 ref. (Q28, ST)

843-Q. Stresses in a Curved Beam. A. D. Richards. *Engineering,* v. 176, July 24, 1953, p. 103-105.

Method of determining the skin stresses in a beam curved in the plane of the applied moment, where the depth of beam is comparable with the initial radius of curvature. Tables, diagrams. (Q25)

844-Q. The Significance of the Izod Test With Regard to Gear Design and Performance. J. E. Russell, and W. T. Chesters. *Engineering,* v. 176, Aug. 7, 1953, p. 166-169.

Shock loading of gears. Graphs, photographs, tables. 8 ref. (Q6, ST)

845-Q. How to Get More From Your Tool Steels. L. H. Seabright. *Iron Age,* v. 172, Aug. 27, 1953, p. 104-108.

Evaluates testing methods for toolsteels. Tables, graphs. (Q general, TS)

846-Q. Effect of Composition on the Warm-Working Characteristics of Austenitic Alloys. G. T. Harris and H. C. Child. *Iron and Steel Institute, Journal,* v. 174, Aug. 1953, p. 325-330.

Effects of base composition, additions of carbon and carbide-forming elements, and heat treatments on stress-rupture properties. Graphs, tables. 5 ref. (Q4, AY)

847-Q. Friction and Boundary Lubrication. A. C. West. *Lubrication Engineering*, v. 9, Aug. 1953, p. 211-217.

Presented at ASLE 8th Annual Meeting, Boston, April 15, 1953. Mechanism of sliding friction under conditions of dry metallic contact and boundary lubrication. Diagrams, micrographs. 77 ref. (Q9)

848-Q. A Summary of Hardness Testing Techniques. R. H. Warring. *Machinery Lloyd* (Overseas Ed.), v. 25, Aug. 1, 1953, p. 117-121.

Description of Brinell, Vickers, Rockwell and Avery tests. Diagrams. (Q29)

849-Q. Metallurgy in the Mechanical Spring Industry. I. Flat Springs. II. Round Wire for Springs. *Mainspring*, v. 15, June 1953, Aug. 1953, unpaged.

Properties of typical spring steels. (Q general, CN)

850-Q. 81B40. Robert N. Imhoff and James W. Poynter. *Metal Progress*, v. 64, July 1953, p. 65-71.

Metallurgical characteristics of 81B40 steel. Includes hardenability, tensile and impact properties, brittleness, fracture types and fatigue tests. Graphs, photographs, tables. (Q23, Q6, Q26, Q7, J26, AY)

851-Q. Creep Resistance of Wrought Carbon Steel. C. H. M. Jenkins and H. J. Tapsell. *Metal Progress*, v. 64, July 1953, p. 130, 132, 134.

Condensed from "Factors Influencing the Creep Resistance of Wrought Carbon Steels", from *Journal of the Iron & Steel Institute*. See item 898-Q, 1952. (Q3, CN)

852-Q. Creep Resisting Ferritic Steels. H. W. Kirby. *Metal Progress*, v. 64, July 1953, p. 134, 136.

Digest of "Creep Resisting Ferritic Steels for Gas Turbines", from *Alloy Metals Review*, v. 8, Dec. 1952, p. 2-6, published by High Speed Steel Alloys Ltd., Widnes, Lancashire, England. Advantages of ferritic steel forgings. (Q3, AY)

853-Q. Ductile Chromium. E. F. Becht. *Metal Progress*, v. 64, July 1953, p. 198.

Digest of "Low Temperature Crystallography of Chromium", Technical Note WCRT 53-69, Apr. 10, 1953, Materials Laboratory, Wright Air Development Center, Dayton. Explanations of ductility of Cr at temperature of liquid air. (Q23, Cr)

854-Q. Cleavage Fracture of Zinc Single Crystals. A. E. Deruyttere and G. B. Greenough. *Nature*, v. 172, July 25, 1953, p. 170-171.

Validity of the normal stress law. Graph. 3 ref. (Q26, Zn)

855-Q. The Mechanism of Stress Birefringence in Amorphous Solids. J. E. H. Braybon. *Physical Society, Proceedings*, v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 617-621.

Resin specimens were used to check theoretical predictions. 8 ref. (Q25)

856-Q. The Surface Deformation Caused on Iron Crystals by Unidirectional Abrasion. R. P. Agarwala and H. Wilman. *Physical Society, Proceedings*, v. 66, no. 404B, sec. B, Aug. 1, 1953, p. 717-719.

Electron diffraction was used to examine electropolished specimens. Diagram. 6 ref. (Q24, Q9, M22, Fe)

857-Q. Unsymmetrical Bending and Bending Combined With Axial Loading of a Beam of Rectangular Cross Section Into the Plastic Range. Anthony J. Barrett. *Royal Aeronautical Society, Journal*, v. 57, Aug. 1953, p. 503-509.

Graphs. (Q5)

858-Q. Mechanical Testing Is Standardized. *Steel*, v. 133, Aug. 31, 1953, p. 75, 91-92.

Data on tension, bend and hardness tests. (Q27, Q5, Q29, S22, ST)

859-Q. Surface Conditions and Mechanical Properties. I.-II. Howard E. Boyer. *Steel Processing*, v. 39, July 1953, p. 330-334; Aug. 1953, p. 383-385, 407.

How tensile strength, elongation, reduction of area, impact strength, corrosion resistance, and heat resistance are dependent on composition and grain structure of steels. Testing methods and effects of heat treatment. Photographs, micrographs, graphs. (Q23, J general, R general, ST)

860-Q. Design of Modern Welded Ships. An Outline of General Principles. W. G. Warren. *Welding and Metal Fabrication*, v. 21, Aug. 1953, p. 277-280.

Tendency for premature failure of welded structure. Diagrams. (Q general, K general, CN)

861-Q. (Norwegian.) **Brittle Fracture and Notch-Impact Test.** Alf Taraldsen. *Teknisk Ukeblad*, v. 100, no. 26, June 25, 1953, p. 557-558.

Theories. (Q23, Q6)

862-Q. Jet Metals. Wilson G. Hubbell. *Aeronautical Engineering Review*, v. 12, Sept. 1953, p. 31-36.

Oxidation resistance, high-temperature strength, and corrosion resistance of Cr, Ni and Co-based alloys and steels. Photographs, graphs. (Q23, R2, R general, SS, Ni, Co)

863-Q. Structural Comparison of Perforated Skin Surfaces With Other Means of Effecting Boundary-Layer Control by Suction. Charles B. Cliett. *Aeronautical Engineering Review*, v. 12, Sept. 1953, p. 46-54.

Tensile and shear strength tests on perforated Al alloy sheets. Graphs, tables, diagrams. 16 ref. (Q23, Q2, Al)

864-Q. How to Understand Alloy Steels. Samuel Storchheim. *American Machinist*, v. 97, Aug. 31, 1953, p. 105-114.

Relationship of alloy steel to plain carbon steel. Desecribes alloy properties in terms of the standard classification. (Q general, AY, CN)

865-Q. Delayed Yielding in Annealed Low-Carbon Steel Under Compression Impact. J. E. Johnson, D. S. Wood, and D. S. Clark. *American Society for Testing Materials*, Preprint no. 70, 1953, 10 p.

A study of the delay time for the initiation of yielding in an annealed low-C steel under longitudinal compression impact. Graphs, diagrams. 3 ref. (Q6, Q28, CN)

866-Q. Influence of Grain Size on Fatigue Notch-Sensitivity. R. W. Karry and T. J. Dolan. *American Society for Testing Materials*, Preprint no. 72, 1953, 13 p.

A study of the reduction in flexural fatigue strength caused by a circumferential notch in specimens of a single-phase metal. Graphs, tables. 14 ref. (Q7, Cu)

867-Q. The Influence of Strain Rate and Temperature on the Strength and Ductility of Mild Steel in Torsion. C. E. Work and T. J. Dolan. *American Society for Testing Materials*, Preprint no. 65, 16 p.

Effect of elevated temperature and rate of strain. Graphs, photograph. 20 ref. (Q23, CN)

868-Q. The Measurement of Directional Strength in Straight and Cross-Rolled Strip Steel by the Navy Tear Test. Helen D. Hoover. *American Society for Testing Materials*, Preprint no. 69, 1953, 17 p.

Measures the directional differences that are known to exist between the two rolling types. Graphs, tables, photographs. 4 ref. (Q23, ST)

869-Q. Properties and Behavior of a High-Strength Rivet Steel. Frank Baron and Edward W. Larson, Jr. *American Society for Testing Materials*, Preprint no. 64, 1953, 13 p.

Mechanical properties of high-strength rivet steel. Graphs, tables, diagrams. 6 ref. (Q general, CN)

870-Q. Report of Committee A-1 on Steel. N. L. Mochel, chairman. *American Society for Testing Materials*, Preprint no. 1, 1953, 50 p.

Work on production testing of steel products. Outlines 46 recommendations made by the committee. Tables, diagrams, photographs, graphs. (Q general, S22, ST, CN)

871-Q. Report of Committee E-9 on Fatigue. R. E. Peterson, chairman. *American Society for Testing Materials*, Preprint no. 59, 1953, 1 p.

Activities on research, papers, survey and large machines. (Q7)

872-Q. Report of Joint Committee on the Effect of Temperature on the Properties of Metals. F. B. Foley and V. T. Malcolm, chairmen. *American Society for Testing Materials*, Preprint no. 62, 1953, 4 p.

Activities of panels and subcommittees on mechanical properties of metal. (Q general)

873-Q. Strength Properties of Rolled Aluminum Alloys Under Various Combinations of Alternating and Mean Axial Fatigue Stresses. B. J. Lazan and A. A. Blatherwick. *American Society for Testing Materials*, Preprint no. 74, 1953, 15 p.

Fatigue data on 14S-T6, 24S-T4 and 75S-T6 Al alloys tested under various conditions of mean and alternating axial stress. Graphs, table. 19 ref. (Q7, Al)

874-Q. Time-Temperature Dependence of the Notch Effect and Influence of Notch Depth in Stress Rupture Tests on a Cr-Mo-V Steel. D. P. Newman, M. H. Jones, and W. F. Brown, Jr. *American Society for Testing Materials*, Preprint no. 68, 1953, 13 p.

Series of tests designed to yield information on the time-temperature dependence of the notch effect on this low-alloy steel. Graphs. 12 ref. (Q4, AY)

875-Q. Creep and Recovery in Metals. A. J. Kennedy. *British Journal of Applied Physics*, v. 4, Aug. 1953, p. 225-233.

Nature of creep and recovery mechanisms in single crystal and polycrystalline metals. Character of creep when periods of recovery, under reduced stress, are interposed. Graphs. 126 ref. (Q3)

876-Q. Influence of Striations on the Plastic Deformation of Single Crystals of Tin. K. A. Jackson and B. Chalmers. *Canadian Journal of Physics*, v. 31, Sept. 1953, p. 1017-1018.

Effect of existing substructure on a substructure subsequently formed by deformation. Micrograph, macrograph. 3 ref. (Q24, Sn)

877-Q. Strength of Copper at Elevated Temperatures. H. L. Burghoff. *Electrical Manufacturing*, v. 52, Sept. 1953, p. 143-145.

Results obtained from a 10-year laboratory investigation of tensile creep properties of nine types of Cu and Cu alloys. Tables, photographs. (Q3, Q23, Cu)

878-Q. Brittle Fracture Studies in the United States. S. L. Hoyt. *Engineering*, v. 176, Aug. 14, 1953, p. 220-221.

Fracture, "match point" and manufacturing variables. (Concluded.) (Q26)

879-Q. Some Aspects of the Tensile Test. E. Siebel and P. Melchior. *Engineers Digest,* v. 14, Aug. 1953, p. 297-300.

Translated and condensed from *Industrie Anzeiger,* v. 75, no. 39, May 15, 1953, p. 4-9 and no. 35, May 1953, p. 3-5. Influence of speed of straining rigidity of the testing machine, nonaxial loading, and shape and surface of the test specimen. How rigidity of the testing machine can be measured and how it influences the autographic record of the machine. Graphs. 6 ref. (Q23)

880-Q. Plastic Stress-Strain Relations Under Radial and Non-Radial Combined Stress Loading. Joseph Marin and John A. Sauer. *Franklin Institute, Journal,* v. 256, Aug. 1953, p. 119-128.

Results for various types of loading, including tests where constant stress ratios were maintained and tests involving variable stress ratios. Graphs. 4 ref. (Q27, Al)

881-Q. The Mechanism of Residual-Stress Formation in Sand Castings. R. N. Parkins and A. Cowan. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 1-8.

Experimental results show that residual stresses in sand castings result from three factors whose magnitude of contribution varies with type casting produced. Special attention given to temperature differences in casting. Diagrams, tables, graphs. 16 ref. (Q25, E11, CI, Cu, Al)

882-Q. Structural Studies of the Creep of Lead. R. C. Gifkins. *Institute of Metals, Journal,* v. 82, Sept. 1953, p. 39-47.

Occurrence of slip traces, grain boundary migration, strain marks from triple points, inhomogeneous strain within grains, tilting and bodily rotation of grains, relative movement of grains, and examination of specimens after large creep extensions. 42 ref. (Q3, Pb)

883-Q. Directionality Affects Physical Properties of Wrought Metals. H. A. Unckel. *Iron Age,* v. 172, Sept. 10, 1953, p. 170-173.

Causes of anisotropy and its effects on strength, and ductility. Tables. 14 ref. (Q23)

884-Q. Airframe Design. P. L. Teed. *Iron & Steel,* v. 26, Sept. 1953, p. 421-426.

Physical and mechanical properties of various metals and their effects on design. Graph, tables. 4 ref. (Q general, P general, T24)

885-Q. Causes and Prevention of Premature Gear Failures. Rankin Johnson, Jr. and S. D. Craine. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 118-128; disc., p. 128-136.

Tooth surface irregularities, abrasives in the oil, mechanical damage, metal or lubricant failure, misalignment and thrust. Photographs, diagram, tables. (Q general, R general, T7)

886-Q. Bending Tests of Thin-Walled Sandwich Cylinders. George Gerard. *Journal of the Aeronautical Sciences,* v. 20, Sept. 1953, p. 639-641.

Series of bending tests. Design using Al alloy faces and either cellular cellulose acetate or end grain balsa cores. Tables, photograph. 3 ref. (Q5, Al)

887-Q. Determination of the Surface Stress by Means of Electroplating. H. Okubo. *Journal of Applied Physics,* v. 24, Sept. 1953, p. 1130-1133.

Method using Cu-plated test pieces and observing flecks on the surface produced by cyclic stress. Diagrams, tables, graph. (Q25)

888-Q. Some Low Temperature Properties of Titanium Alloy RC-130-B and Stainless Steel. W. W. Tyler, L. B. Nesbitt, and A. C. Wilson, Jr. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1104-1105.

Investigation of thermal conductivity and impact strength of Ti alloy, RC-130-B and 316 stainless steel. Graphs. (Q6, P11, Ti, SS)

889-Q. Creep Behavior of Extruded Electrolytic Magnesium. C. S. Roberts. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1121-1126.

Creep mechanism and kinetics of fine-grained Mg were studied from 200 to 600° F. As a result of a photographic study of microstructural changes, transient and steady-state creep components were correlated with slip, subgrain formation, and cyclic deformation at the grain boundaries. Graphs, micrographs. 30 ref. (Q3, Q24, Mg)

890-Q. Plasticity of Columbium Single Crystals. R. Maddin and N. K. Chen. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1131-1136.

Cb single crystals were deformed in tension and compression. Diagrams, micrographs. (Q23, Cb)

891-Q. Effect of Grain Size Upon Temper Brittleness. L. D. Jaffe, F. L. Carr, and D. C. Buffum. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1147-1148.

Investigation using SAE 3140 steel. Graphs. (Q23, AY)

892-Q. A Rationalization of Measured High Temperature Properties of Fe-Cr-Co-Ni Alloys. J. D. Nisbet and W. R. Hibbard, Jr. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1149-1165.

High-temperature properties of Fe-Cr-Co-Ni-base alloys and effects of hardening element additions on those properties discussed on basis of general principles of alloying. Graphs, diagrams, table, micrographs. 29 ref. (Q general, Fe, Cr, Co, Ni)

893-Q. Inhomogeneity in Creep Deformation of Coarse Grained High Purity Aluminum. H. C. Chang and N. J. Grant. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1175-1180.

Creep of very coarse grained high-purity Al was studied at 400, 700, and 1100° F. at initial stresses of 50 to 1200 psi. Local strain measurements were made across the grain boundaries and in different regions of various grains during creep. Significance of creep curve equations and activation energies. Diagrams, graphs, micrographs. (Q3, Al)

894-Q. Plastic Stress-Strain Relations for Aluminum Alloy 14S-T6 Subjected to Combined Tension and Torsion. Joseph Marin and H. A. B. Wiseman. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1181-1190.

Experimental study. Plastic stress-strain relations for both constant and various types of variable stress ratios were determined. Comparison made with the simple flow theory of plasticity. Graphs. (Q23, Al)

895-Q. Deformation Mechanisms in Alpha Titanium. E. A. Anderson, D. C. Jillson, and S. R. Dunbar. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1191-1197.

Study of pure Ti at room temperatures. Tables, diagrams, micrographs. (Q24, Ti)

896-Q. Effects of Solid Solution Alloying on the Cold-Rolled Texture of Titanium. Carl J. McHargue, Sam E. Adair, Jr., and Joseph P. Hammond. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1199-1203.

Cold-rolled sheet textures were determined for binary solid solutions of Al, Cb, Ta, and Zr in Ti. Diagrams. (Q24, M24, Ti)

897-Q. Plastic Deformation of Rectangular Zinc Monocrystals. John J. Gilman. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1217-1222.

Data which indicate that critical shear stress and strain-hardening rate of a Zn monocrystal depend on the orientation of its slip direction with respect to its external boundaries. Diagrams, tables. 13 ref. (Q24, Zn)

898-Q. Variation of Plastic Properties With Annealing Procedure in Zinc Single Crystals. Choh Hsien Li, J. Washburn, and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1223-1225.

Yield stress in Zn single crystals is dependent on prior annealing temperature and rate of cooling after annealing. Tentative mechanism for the effect. Graphs. (Q23, J23, Zn)

899-Q. Relation Between Initial Creep Rate and Resolved Shear Stress in Zinc Single Crystals. N. Brown, J. Washburn, and Earl R. Parker. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1229-1230.

Investigation to establish some reproducible relation between initial creep rate and resolved shear stress at higher stress levels where the total creep strain is not limited. (Q3, Q2, Zn)

900-Q. Plastic Deformation of Single Crystals of Copper. J. J. Becker and J. N. Hobstetter. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1231-1234.

Microscopic features of the plastic deformation of Cu single crystals. Micrographs. (Q23, Cu)

901-Q. Plastic Deformation of Iron Between 300° and 77.2° K. Donald F. Gibbons. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1245-1250.

Study of tensile deformation on two samples. Graphs, micrographs. 19 ref. (Q24, Fe)

902-Q. Efficient Structures in Aluminium. M. Bridgewater. *Machinery Lloyd (Overseas Ed.)* v. 25, Aug. 29, 1953, p. 81, 83-85.

Properties of Al in respect to structural uses. Diagrams, photographs. (Q general, Al)

903-Q. Boron in Steel. *Machinery Lloyd (Overseas Ed.),* v. 25, Aug. 29, 1953, p. 87, 89-92.

Effect of B on hardenability, brittleness, creep resistance, and weld-

ing properties of high speed steel and special alloys. Graphs. (Q23, Q3, J26, K general, ST)

904-Q. New Creep Resistant Ferritic Steels. David D. Howat. *Materials & Methods,* v. 38, Sept. 1953, p. 87-90.

Advantages and disadvantages. Development of ferritic steels for gas turbines. Tables, graphs. 9 ref. (Q3, T25, AY)

905-Q. Selecting Materials to Meet Mechanical Design Requirements. J. R. Hunt. *Materials & Methods,* v. 38, Sept. 1953, p. 102-107.

Yield strength, elastic modulus, density, and price of various materials. Tables. (Q23, Q21, P10, ST, Al, Mg, Cu, Ni, Ti)

906-Q. Modern Cast Irons. A Digest of Data on Currently Used Materials. K. J. A. Brookes and R. H. Warring. *Mechanical World and Engineering Record,* v. 133, Sept. 1953, p. 398-401.

Typical specifications and properties. Tables, diagrams. (Q general, S22, CI)

907-Q. Endurance of Helical Springs Related to Properties of the Wire. H. C. Burnett and C. L. Staugaitis. *Metal Progress,* v. 64, Sept. 1953, p. 77-81.

Methods of fatigue testing spring wire and completed springs. Photographs, table, graphs. (Q7)

908-Q. Properties and Structure of Titanium After 30-Min. Heating at 1200 to 2000° F. E. Walden and L. A. Dixon. *Metal Progress,* v. 64, Aug. 1953, p. 88-89.

Tensile strength and elongation properties. Tables, micrographs. (Q23, Ti)

909-Q. High-Temperature Strength of Aluminum-Magnesium Alloys. I. I. Kornilov and L. I. Pryakhina. *Metal Progress,* v. 64, Aug. 1953, p. 140-143.

Digest of "Effect of Temperature on the High-Temperature Strength of Alloys in the Aluminum-Magnesium System", *Doklady Akademii Nauk SSSR,* v. 87, 1952, p. 971-974. Creep at temperatures up to 750° F. (Q3, Al, Mg)

910-Q. Sigma Phase in Heat Resisting Steels. J. I. Morley and H. W. Kirby, *Metal Progress,* v. 64, Sept. 1953, p. 140-142, 144.

Condensed from "Sigma-Phase Embrittlement in 25 Cr-20 Ni Heat Resisting Steels", *Iron and Steel Institute, Journal,* v. 172, Oct. 1952, p. 129-142. Influence of prior heat treatment, annealing temperature, exposure times, grain size, reduction by cold work, and varying amount of C, Cr, Ni, N_2, Si, Nb and Ti. (Q23, M26, AY)

911-Q. Compression Properties of Aluminium Alloys. D. A. Barlow and A. W. Brace. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 399-404.

Rivet driving characteristics agreed with compression test results. Tensile data gave little indication of compressive ductility. Tables, photographs, diagram. (Q28, K13, Al)

912-Q. Some Remarks Regarding Wear on the Flanks of Carbide Cutting Tools. L. H. Hovenkamp and E. Van Emden. *Microtecnic (English Ed.),* v. 7, no. 3, 1953, p. 116-119; disc., p. 120-121.

Cause of abnormal wear. Diagrams, micrographs. (Q9, G18, C-n)

913-Q. Contribution to the Study of the Resistance to Wear of Cutting Tools. M. F. Eugéne. *Microtecnic (English Ed.),* v. 7, no. 3, 1953, p. 122-126.

Translated from the French. Investigation of wear distribution on cutting tools. Diagrams, micrographs. (Q9, G18, SG-j)

914-Q. Original Method of Measuring the Intrinsic Resistance to Wear of Cutting Tools. M. F. Eugéne. *Microtecnic (English Ed.),* v. 7, no. 3, 1953, p. 127-131; disc., p. 131.

Translated from the French. Method which is relatively independent of material machined and machining variables. (Q9, G17, SG-j)

915-Q. Behavior of Materials Under Conditions of Thermal Stress. S. S. Manson. *National Advisory Committee for Aeronautics,* Technical Note no. 2933, July 1953, 105 p.

Reviews available information on the behavior of brittle and ductile materials. (Q23)

916-Q. Calibration of Strain-Gage Installations in Aircraft Structures for the Measurement of Flight Loads. T. H. Skopinski, William S. Aiken, Jr., and Wilber B. Huston. *National Advisory Committee for Aeronautics,* Technical Note no. 2993, Aug. 1953, 70 p.

General method for calibrating strain-gage installations in aircraft structures. Permits measurement in flight of the shear or lift, bending moment, and torque or pitching moment on the principal lifting or control surfaces. Tables, diagrams, graphs. (Q25)

917-Q. The Release of the Energy Stored in Deformed Nickel. L. M. Clarebrough, M. E. Hargreaves and G. W. West. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 913-915.

Measurements of energy stored during deformation were made on Ni and correlated with measurement of hardness and electrical resistivity. 10 ref. (Q24, Q29, P15, Ni)

918-Q. Effect of Plastic Deformation on Subsequent Decomposition in Aluminum Alloys Al-Si and Al-Mg-Si. N. N. Buinov and V. P. Savinykh. *National Science Foundation Translation,* no. NSF-tr-9, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 257.

Precipitation, block structure and alterations in submicroscopic structure caused by deformation. Micrographs. 4 ref. (Q24, Al)

919-Q. Resistance to Abrasive Wear and the Hardness of Metals. M. M. Khrushchov and M. A. Babichev. *National Science Foundation Translation,* no. NSF-tr-15, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 88, 1953, p. 445.

Relative resistance to wear is directly proportional to hardness. Graphs, tables. (Q9, Q29, Fe, CN)

920-Q. An Estimate of Displacements and Deformations of Underground Gas Conduits Due to Temperature. K. S. Zarembo. *National Science Foundation Translation,* no. NSF-tr-18, June 1953, 4 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 53.

Stresses in pipe lines caused by pressure and temperature of gas and of soil surrounding the pipe. Table, graphs. 4 ref. (Q25, ST)

921-Q. On a "New" Mechanism of Plasticity of Metallic Solid Solutions. K. A. Osipov, S. G. Fedotov, and M. G. Lozinsky. *National Science Foundation Translation,* no. NSF-tr-19, June 1953, 5 p. Original in *Doklady Akademii Nauk SSSR,* v. 89, 1953, p. 57.

Experimental data confirming the possibility that a nonslip mechanism of plasticity takes place in a solid solution of Cu and Pb. Graph, micrographs. 16 ref. (Q23, Cu, Pb)

922-Q. Interaction Between Crystal Slip and Grain Boundary Movement. D. McLean. *Nature,* v. 172, Aug. 15, 1953, p. 300-301.

Creep mechanism using data from Al specimens. (Q3, M27, Al)

923-Q. Score Resistance of Bearing Metals. Arvid E. Roach, Carl L. Goodzeit, and Paul A. Totta. *Nature,* v. 172, Aug. 1953, p. 301.

Effects of solid solution formation on bearing properties. (Q9, SG-m)

924-Q. Titanium at Work. Carl E. Hartbower. *Ordnance,* v. 38, Sept.-Oct. 1953, p. 345-347.

Properties of Ti and uses in military equipment. Tables, photographs. (Q general, T2, Ti)

925-Q. A Note on the Portevin-Le Chatelier Effect. A. H. Cottrell. *Philosophical Magazine,* v. 44, ser. 7, Aug. 1953, p. 829-832.

In Al, if concentration of vacancies is increased by plastic deformation or quenching, the rate of diffusion may increase sufficiently to cause strain aging during plastic deformation. A serrated stress-strain curve should result. This is used to explain the Portevin-Le Chatelier effect. 18 ref. (Q24, J26, Al)

926-Q. The Growth of Fatigue Cracks. A. K. Head. *Philosophical Magazine,* v. 44, 7th ser., no. 356, Sept. 1953, p. 925-938.

Qualitative features. Graphs, diagrams. 9 ref. (Q7)

927-Q. Slip Lines and Etchpits. S. Amelinckx. *Philosophical Magazine,* v. 44, 7th ser., no. 356, Sept. 1953, p. 1048-1049.

Study of distribution of dislocations along slip lines in Al. 10 ref. (Q24, Al)

928-Q. The Variation of the Elastic Constants of Crystalline Aluminum With Temperature Between 63° K. and 773° K. Paul M. Sutton. *Physical Review,* v. 91, ser. 2, Aug. 15, 1953, p. 816-821.

Measurement of adiabatic elastic moduli of crystalline Al using composite piezoelectric oscillator. Diagram, tables, 30 ref. (Q21, Al)

929-Q. Deformation of Copper Single Crystals at 300° K. and 78° K. T. H. Blewitt. *Physical Review,* v. 91, ser. 2, Sept. 1, 1953, p. 1115-1121.

Data showing effect of deformation on electrical resistivity and other properties. Tables, graphs, diagrams. 28 ref. (Q24, P15, Cu)

930-Q. Fatigue. H. L. Cox. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 559-565; disc., p. 589-593.

Theory and causes of fatigue in metals. Graphs, photographs. (Q7)

931-Q. Fatigue From the Metallurgist's Viewpoint. E. R. Gadd. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 565-580; disc., p. 589-593.

Structural discontinuities and grain flow; effect of nitriding, cyaniding, carburizing, decarburization, surface hardening, cold work and surface coatings; and influence of temperature and environment. Tables. 78 ref. (Q7)

932-Q. Fatigue in Engine Design. F. M. Owner. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 580-584; disc., p. 589-593.

Design aspects of fatigue, assessment of conditions of loading, effect of damping, diversity of parameters, fatigue life and design maxims. (Q7)

933-Q. Fatigue in Aircraft Design. B. E. Stephenson. *Royal Aeronautical Society, Journal,* v. 57, Sept. 1953, p. 584-588; disc., p. 589-593.

Causes of fatigue and possible remedial actions. Diagrams, graphs. (Q7)

934-Q. Proposed New Scales for Expressing the Stiffness of Round and Flattened Wire. J. M. Thomas and L. Thomassen. *Wire and Wire Products,* v. 28, Sept. 1953, p. 875-876, 924.

Method of combining cross section, torque applied, and degree of bend into a single term. Photographs, tables. (Q23, ST)

935-Q. Investigation of Stress Waves in Cylindrical Steel Bars by Means of Wire Strain Gauges. S. Petersson. *Acta Polytechnica (Mechanical Engineering Series),* v. 2, no. 7, 1953, 21 p.

Techniques. Effects of damping and stress frequency studied by oscillograph. Diagrams. 7 ref. (Q25, ST)

936-Q. (English.) **Some Effects of Minor Elements on the Characteristics of Plain Carbon Steels.** Francis W. Boulger. Bogota Conference, Oct. 13-Nov. 5, 1952. ST/ECLA/CONF. no. 1/L.75, 1952, 16 p. Published jointly by ECLA-TAA for United Nations.

Effects of S, P, and N on the properties of low and medium C steels. Table. 40 ref. (Q general, CN)

937-Q. (Dutch.) **Progress in the Investigation of Mechanical Properties.** A. J. Staverman. *T.N.O.-Nieuws,* v. 8, no. 86, June 1953, p. 195-200.

Various nondestructive tests based upon the principle that mechanical properties are the result of the chemical and physical structure of the material. Photographs. (Q general, S general)

938-Q. (French.) **Statistical Study of the Elastic Transition as a Function of Temperature in Soft and Extra Soft Steels.** Jeanine Ulmo, Francois Bastenaire, and René Borione. *Comptes rendus,* v. 237, no. 1, July 6, 1953, p. 59-62.

Statistical methods to determine the temperature zone in which the passage from elastic to brittle state occurs. Diagrams. (Q23, ST)

939-Q. (French.) **Influence of Primary Structure on the Modulus of Elasticity of Gray Pig Iron.** Elisabeth Plenard. *Comptes rendus,* v. 237, no. 3, July 20, 1953, p. 260-262.

A study on the relation of graphitic lamina length to structure of the matrix. Graphs, table. 3 ref. (Q21, CI)

940-Q. (French.) **Structural Changes of Aluminum and Its Alloys During Flow. I.** G. Wyon. *Metaux, Corrosion-Industries,* v. 28, no. 333, May 1953, p. 203-221.

Experimental results and their interpretation. Microphotographs. (To be continued.) (Q24, Al)

941-Q. (French.) **Structural Changes of Aluminum and Its Alloys During Flow. II.** G. Wyon. *Metaux, Corrosion-Industries,* v. 28, no. 334, June 1953, p. 244-261.

Channelized creep. Presence of 0.1% Zr increased resistance to extrusion. Photomicrographs, diagrams. 20 ref. (Q24, Q3, Al)

942-Q. (French.) **Fracture Strength of Steel Using U-Shaped Specimens and Tensile Testing at a Slow Rate.** Wilhelm Ruttmann, Gerhard Bandel, and Rudolf Schinn. *Metaux, Corrosion-Industries,* v. 28, no. 334, June 1953, p. 262-274.

Tests for heat resistant steels using various temperatures and stress conditions. Tables, photographs. 9 ref. (Q26, Q27, ST)

943-Q. (German.) **Behavior of Metallic Substances, Especially of Steels, at Low Temperatures.** S. Henkel. *Chemische Technik,* v. 5, no. 6, June 1953, p. 322-325.

Mechanical properties of steels, Al, and Al alloys were determined down to −180° C. Tables, graphs. 14 ref. (Q general, ST, Al)

944-Q. (German.) **Determining "True" Limit of Elasticity by Alternating Tension Testing.** E. Mohr. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 19, Ausgabe B, no. 2, 1953, p. 33-43.

Method purported to be cheaper, more accurate and more sensitive to influence of notching. Graphs, table. 19 ref. (Q21, Q27, Al, Mg, Fe)

945-Q. (German.) **Tests of Single-Row Light-Metal Riveted Joints.** K. Wellinger and H. Uetz. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 586-592.

Tensile and shear testing of various Al alloys. Photographs, graphs, diagrams, tables. 4 ref. (Q27, Q2, K13, Al)

946-Q. (German.) **Regression of Cold-Tempering in Al-Zn-Mg Alloys.** W. Rosenkranz. *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 598-602.

Tests showing that hardness properties are stable only up to temperatures of 60 to 70° C. Decrease of hardness is proportional to the temperature increase. Graphs, tables. 2 ref. (Q29, Al)

947-Q. (German.) **Properties of Rimmed Low-Carbon Basic Bessemer Steel After Water Hardening From Rolling Temperature.** Walther Dick. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 945-966.

Aging resistance, stress values, brittle fracture, influence of brief local heat effects and notched-bar impact bending. Graphs, tables, photographs. 14 ref. (Q general, J26, ST)

948-Q. (Hungarian.) **Investigation of the Friction Properties of Bearing Metals.** Jozsef Czégi. *Aluminium (Budapest),* v. 5, no. 2, Feb. 1953, p. 31-45.

Extensive investigation by the Hungarian Bronze Committee on Al, bronze and Fe bearings. Results evaluated theoretically and practically. Tables, graphs. 19 ref. (Q9, Al, Cu, Fe)

949-Q. (Hungarian.) **Effect of Microstructure on the Plasticity of Unalloyed Steels. I.** Odön Szabo. *Kohaszati Lapok,* v. 8, no. 2, Feb. 1953, p. 47-48.

Processes taking place during shear tests and relationships between change in form and hardening by means of a true stress-compression diagram. Graphs. (Q23, CN)

950-Q. (Italian.) **New Orientations in the Study of the Mechanical Properties of Solids.** F. Gatto. *Alluminio,* v. 22, no. 2, 1953, p. 137-147.

New parameters and examples of their applications. Graphs. 33 ref. (Q general, Al, Mg, Zn)

951-Q. (Italian.) **Impact Test of Light Alloys.** F. Gatto. *Alluminio,* v. 22, no. 3, Mar. 1953, p. 271-286.

Influence of specimen shape, test speed, and temperature. Tables, graphs, photographs, micrographs. 34 ref. (Q6, Al)

952-Q. (Portuguese.) **Practical and Metallurgical Aspects of Martensitic White Cast Iron With Reference to Its Application Against Abrasion.** Kenneth A. DeLonge and Horace A. Hunnicutt. *ABM (Boletim da associacao brasileira de metais),* v. 9, no. 30, Jan. 1953, p. 21-46.

Advantages of martensitic structure in abrasion resistance and practical application of these advantages. Various production methods. Tables. (Q9, CI)

953-Q. (Russian.) **Deformations and Stresses of a Steel Sheet by Localized Heating.** O. A. Bakshi. *Avtogennoe Delo,* v. 24, no. 2, Feb. 1953, p. 1-6.

Problem of elastic-plastic equilibrium in thin disks. Solution permits determination of stresses and deformations in thin sheets. Diagrams, graphs. 7 ref. (Q21, Q23, Q25, ST)

954-Q. (Swedish.) **Influence of Primary Creep on Stresses in Structural Parts.** Folke K. G. Odqvist. *Kungl. Teknishka Högskolans Handlingar (Transactions of the Royal Institute of Technology,* Stockholm, Sweden), no. 66, 1953, 16 p.

How primary creep may be considered within a purely phenomenological theory and how it is possible to extend it to general 3-dimensional stress systems. Graphs, diagrams. (Q3)

955-Q. A New High Range Strain Gage. James A. Hurry and Richard P. Woolley. *Rubber Age,* v. 73, Sept. 1953, p. 799-800.

Hg-filled "wire" which gave reliable results at up to 50% strain for over 2000 cycles. Photographs, graph. (Q25)

956-Q. (Book.) **Behavior of Metals at Low Temperatures.** R. M. Brick, J. R. Low, Jr., and C. H. Lorig. 113 p. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $3.00.

Three lectures presented at the National Metal Congress in October 1952. The first deals with the behavior of single crystals and of pure metals; the second with influence of mechanical variables; and the third, with influence of metallurgical factors. (Q general)

957-Q. (Book.) **Strain Gauges. Theory and Application.** J. J. Koch, R. G. Boiten, A. L. Biermasz, G. P. Roszbach, and G. W. Van Santen, 95 pages. 1952. Philips Library, Eindhoven, Netherlands. American distributor, Elsevier Press, 402 Lovett Blvd., Houston 6, Texas. $2.75.

Construction and properties of strain gages; measuring instruments; technique of cementing and connecting strain gages; evaluation and interpretation of values measured; stresses and theories of failure; and application of strain gages in measuring instruments. (Q25)

958-Q. (Book—German.) **(Elasticity and Strength in Pipe Construction.) Elastizität und Festigkeit im Rohrleitungsbau.** Helmut von Jürgensonn. Rev. ed. 2. 400 p. 1953. Verlag Stahleisen m.b.H., Postfach 2590, Düsseldorf, Germany. 40 DM.

Strength calculations of pipes; general principles; raw materials and their properties; effect of pressure and temperature on the pipe wall; thermal expansion and its equilibrium; and elastic calculations of pipe lines. (Q general)

R
Corrosion

384-R. The Place for Zinc in Cathodic Protection. H. W. Wahlquist. *American Zinc Institute Incorporated, Journal,* v. 31, 1953, p. 117-121.

Advantages of Zn usage. (R10, Zn)

385-R. Laboratory Investigation of Superheater-Tubing Materials in Contact With Synthetic Combustion Atmospheres at 1350° F. C. J. Slunder, A. M. Hall, and J. H. Jackson. *ASME, Transactions,* v. 75, Aug. 1953, p. 1015-1019; disc., p. 1019.

Variables in the corrosive environment included two concentration levels of SO_3, CO, and alkali-metal salts. Tables, diagram, graph. (R11, AY)

386-R. Resistance of Cast Fe-Cr-Ni Alloys to Corrosion in Oxidizing and Reducing Flue-Gas Atmospheres. J. H. Jackson, C. J. Slunder, O. E. Harder, and J. T. Gow. *ASME Transactions,* v. 75, Aug. 1953, p. 1021-1034; disc., p. 1034-1035.

Attention was directed primarily toward attack by S-containing gases. Micrographs, diagrams, tables, photographs, graphs. 13 ref. (R9, Fe, Cr, Ni)

387-R. Corrosion of Mercury-Boiler Tubes During Combustion of a Heavy Residual Oil. A. M. Hall, D. Douglass, and J. H. Jackson. *ASME, Transactions,* v. 75, Aug. 1953, p. 1037-1049.

Test procedure and results determining causes of corrosion and possible remedies. Tables, diagrams, graphs. 15 ref. (R7, AY)

388-R. Underground Corrosion of Galvanized Steel Pipe. Michael Lorant. *British Steelmaker,* v. 19, Aug. 1953, p. 472-473, 485.

Compares uncoated and galvanized steel. Photograph, graph. (R8, CN)

389-R. On High-Temperature Sulphurization of Chromium Cast Iron and Chromium Cast Steel. Masakazu Shiozawa and Hiroshi Nakai. *Castings Research Laboratory, Report,* no. 4, 1953, p. 17-19.

Relations between Cr content and loss of weight due to H_2S attack of Cr-cast iron and steel. (R6, CI)

390-R. Why Gas Plants Should Be Surveyed to Determine Corrosion Damage. E. W. Wallace. *Gas Age,* v. 112, Aug. 13, 1953, p. 47-49, 74, 77.

Presented before annual convention, Natural Gasoline Association of America, Houston, Tex., May 1, 1953. Typical field experience with gas plant equipment and accessories. Emphasizes that corrosion is not limited to the wells alone. (R11)

391-R. Scale Formation in Sea-Water Distilling Plants and Its Prevention. H. Hillier. *Institution of Mechanical Engineers, (London), Proceedings, Steam Group,* v. 1B, no. 7, 1952, p. 295-314.

Performance of plants and scale prevention. Graphs, tables, diagrams, photographs. (R2, R4)

392-R. New Tests Prove Materials for Nuclear Power Plants. Robert F. Koenig. *Iron Age,* v. 172, Aug. 20, 1953, p. 129-133.

Corrosion of structural metals by liquid Na. Data on resistance of materials to liquid metals. Graph, table, diagram, photographs. (R6)

393-R. Laboratory Measurement of the Corrosion of Ferrous Metals in Soils. W. J. Schwerdtfeger. *Journal of Research, National Bureau of Standards,* v. 50, June 1953, p. 329-336.

Method for setting up soil-corrosion cells using a soil-wetting procedure that gives reproducible results. Weight losses on electrodes made of steel and of cast iron were compared after exposure to various soils for six months. Tables, diagrams. 12 ref. (R11, R8, ST, CI)

394-R. Corrosion Cracking of Martensitic Stainless Steel. A. E. Durkin. *Metal Progress,* v. 64, July 1953, p. 72-75.

Data showing cracking is caused by hydrogen embrittlement under certain corrosive conditions. Graphs. (R1, SS)

395-R. Corrosion of 18-8 in Oxidizing Solutions. M. M. Kurtepov and G. V. Akimov. *Metal Progress,* v. 64, July 1953, p. 124, 126.

Translated and condensed from "Corrosion Properties of Stainless Steels in Oxidizing Solutions", *Doklady Akademii Nauk SSSR,* v. 87, 1952, p. 1005. Results of influence of additions of $K_2Cr_2O_7$, NH_4VO_3, and KIO_3 to HNO_3 on the electrode potentials and kinetics of electrode processes on stainless steels. (R5, SS)

396-R. Corrosion for Pipeliners. Corrosion Control an Economic Necessity. Starr Thayer. *Pipe Line News,* v. 25, Aug. 1953, p. 39-41.

Costs of corrosion to the pipeline industry. (R general)

397-R. Port Townsend Digesters. Corrosion Developments and How They Were Met. H. E. Bukowsky. *Pulp & Paper,* v. 27, Aug. 10, 1953, p. 55-58.

Corrosion and treatment in pulp digesters. (R general)

398-R. How They Resist Corrosion. *Railway Age,* v. 155, Aug. 10, 1953, p. 87-89.

Comparative corrodibility of Cr-Mn and Cr-Ni stainless steels. Photographs. (R general, SS)

399-R. What Corrosion Inhibitors Should and Should Not Do. J. F. Wilkes. *Railway Locomotives and Cars,* v. 127, Sept. 1953, p. 77-83.

Solutions to problems of treatment of diesel-engine cooling water. Photographs. (R10)

400-R. Oil Industry Tries Out Aluminum for Pipe Line. *Welding Journal,* v. 32, Aug. 1953, p. 740-741.

Corrosion resistance and welding of pipes. (R general, K general, Al)

401-R. The Chemical Resistance of Glass Fused to Steel. E. A. Sanford and O. J. Britton. *American Society for Testing Materials,* Preprint no. 92a, 1953, 6 p.

Resistance to acid corrosion. Table, photographs. (R6, ST)

402-R. The Corrosion of Beryllium Copper Strip in Sea Water and Marine Atmospheres. John T. Richards. *American Society for Testing Materials,* Preprint no. 71, 1953, 18 p.

Results for corrosion tests on Be-Cu and Be-Co-Cu conducted over the past two years. Tables, graphs, photographs. 12 ref. (R4, R3, Co, Be, Cu)

403-R. Report of Committee A-5 on Corrosion of Iron and Steel. A. P. Jahn, chairman. *American Society for Testing Materials,* Preprint no. 3, 1953, 33 p.

Work on atmospheric exposure tests and tests for weight of Zn coatings. Tables, photographs. (R11, L general, Fe, ST, Zn)

404-R. Report of Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys. K. G. Compton, chairman, *American Society for Testing Materials,* Preprint no. 9, 1953, 2 p.

Reports on spray tests, atmospheric corrosion, and galvanic and electrolytic corrosion. (R11, R1, R3, EG-a)

405-R. Report of Committee D-12 on Soaps and Other Detergents. J. C. Harris, chairman, *American Society for Testing Materials,* Preprint no. 43, 1953, 10 p.

Revisions of specifications and proposed method of test for determining the corrosive effects of metal cleaners. (R7, L12)

406-R. On the Mechanism of the Dissolution of Magnesium in Acidic Salt Solutions. I. Physical Control by Surface Films. E. J. Casey and R. E. Bergeron. *Canadian Journal of Chemistry,* v. 31, Sept. 1953, p. 849-867.

An example of the simplest type of corrosion involving H_2 evolution. Results indicate presence of a surface film of oxide or hydroxide even in acid solutions. Graphs, tables. 24 ref. (R5, Mg)

407-R. The Corrosion Forum. Cast High Alloys. E. A. Schoefer. *Chemical Engineering,* v. 60, Oct. 1953, p. 298, 300, 302, 304, 306, 308-312.

Difference in performance between cast and wrought alloys. Photographs, graphs, tables. (R general, SS)

408-R. The Corrosion Forum. Zirconium. John D. Roach. *Chemical Engineering,* v. 60, Sept. 1953, p. 304, 306, 308.

Performance of Zr and its similarity to Ti metal. Charts. 11 ref. (R general, Zr)

409-R. Special Steels for the Petroleum Chemicals Industry. E. Smith. *Chemistry and Industry,* 1953, Aug. 10, p. S9-S17.

Characteristics and performance of nine stainless steels as applies to high-temperature and corrosion resistance properties. Micrographs, tables. (R general, SS)

410-R. Corrosion-Fatigue Failure of a Marine Propeller Shaft. Carl A. Zapffe. *Corrosion,* v. 9, Sept. 1953, p. 298-302.

Forms of fracture in which chemical attack combines with mechanical stress to destroy an engineering structure. Fracture terminology. Photographs, micrographs. 13 ref. (R1, Q26, ST)

411-R. Cathodic Protection of Underriver Pipe Lines. C. C. Loyd and John R. Whitney. *Corrosion,* v. 9, Sept. 1953, p. 303-306.

Details of design, installation, and legal problems. Diagrams, table. (R10)

412-R. Studies on Water-Dependent Corrosion in Sweet Oil Wells. H. E. Greenwell. *Corrosion,* v. 9, Sept. 1953, p. 307-312; disc., p. 312.

Present understanding of problems and means of detection and control. Tables. (R7)

413-R. Corrosion of Casing in Oil and Gas Wells. Jack L. Battle. *Corrosion,* v. 9, Sept. 1953, p. 313-320.

Various causes of corrosion failures, methods of repair and preventive measures currently practiced. Tables. 8 ref. (R general)

414-R. Casing Corrosion in West Texas-New Mexico. R. L. Elkins. *Corrosion,* v. 9, Sept. 1953, p. 321-324.

Casing repair methods and corrosion mechanisms, detection and control. Photographs. (R general)

415-R. Cable System Design for Cathodic Protection Rectifiers. Ray M. Wainwright. *Corrosion,* v. 9, Sept. 1953, p. 325-328.

Considerations involved and economic implications of cable design. Tables, graph. (R10)

416-R. Some Notes on the Oxidation Resistance of Boron-Containing Chromium-Nickel-Cobalt-Iron Alloys. W. O. Binder and E. D. Weisert. *Corrosion,* v. 9, Sept. 1953, p. 329-332.

Effect of B on oxidation resistance of alloys. Tables, graphs. (R2)

417-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 45, Sept. 1953, p. 95A-96A, 101A.

A new high-temperature Cr-Ni-W alloy suitable for applications up to 2200° F. Photographs, tables. (R general)

418-R. Corrosion-Inhibitive Compositions as Temporary Protectives of Steel Against Atmospheric Corrosion. B. Sanyal and R. St. J. Preston. *Journal of Applied Chemistry,* v. 3, Aug. 1953, p. 366-374.

Performance of 16 aqueous systems investigated. Bentonite pastes gave best results and were easier to use. Emulsions with castor oil, hydrocarbon oils and bitumens were evaluated. Tables, graphs. 10 ref. (R3, R10, ST)

419-R. High Pressure Oxidation Rate of Metals. Copper in Oxygen. William McKewan and W. Martin Fassell, Jr. *Journal of Metals,* v. 5, sec. 1, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1127-1130.

Oxidation rates of Cu were determined from 600 to 900° C. in O_2 from 14.7 to 400 psi. total O_2 pressure. Graphs. (R3, Cu)

420-R. Tests Show Corrosion Resistance of Aluminum. C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr. *Light Metal Age,* v. 11, Aug. 1953, p. 18-19, 22, 28.

Tests made over a period of years exposing Al specimens to the atmosphere. Diagrams. (R3, Al)

421-R. Corrosion of Structural Materials in Water. C. R. Breden, S. Greenberg, R. M. Robinson, A. H. Roebuck, V. F. Saitta, and C. C. Scott. *Metal Progress,* v. 64, Aug. 1953, p. 194, 196, 198, 200.

Digest of "Water Corrosion of Structural Materials," Report No. ANL 4519, Argonne Nat'l. Laboratory, July 1951. Results of extensive tests on stainless steel and other materials in H_2O from 70 to 650° F. (R4)

422-R. Intergranular Corrosion of High-Purity Aluminum. M. J. Lavigne. *Metal Progress,* v. 64, Sept. 1953, p. 84-86.

Mechanism of corrosion by distilled H_2O at 100 and 150° C. Micrographs. (R2, Al)

423-R. Watch that Arc! It's a Hazard in Cathodic-Protection Cables. Marshall E. Parker. *Oil and Gas Journal,* v. 52, Sept. 7, 1953, p. 97, 119.

Emphasizes danger of cutting a pipeline carrying a current. Suggests installation of a temporary bond across any joint to be broken, so arranged that it can be opened at a location free from dangerous vapors. Diagrams. (R10)

424-R. Corrosion in Pulp & Paper Industry. F. A. Guba. *Paper Mill News,* v. 76, Aug. 22, 1953, p. 72, 74, 77.

Types of corrosion encountered in paper mills. Suggests alloys suitable for use in paper-mill equipment. Tables. (R general, T29, SS)

425-R. Solving Corrosion Problems in the Paper Industry With Plastics. Raymond B. Seymour and George P. Gabriel. *Paper Mill News,* v. 76, Aug. 22, 1953, p. 98, 100, 102, 108, 146.

Coatings, membrane linings and chemical resistant cements. (R10, L26)

426-R. Practical Solutions to Five Common Corrosion Problems. John F. Mason. *Petroleum Processing,* v. 8, Sept. 1953, p. 1332-1335.

Corrosion of polycharge preheaters, crude fractionating tower tops, amine gas plant reboiler tubes, Linde gasoline treater eductors and gasoline condenser equipment. Tables.
(R general, Ni, Cu, Al, SS, CN, CI)

427-R. Considerations Involved in the Selection and Use of Stainless Steels. E. Smith. *Sheet Metal Industries,* v. 30, no. 317, Sept. 1953, p. 763-766, 820.

Properties of several types of corrosion resistant steels. Photographs, tables.
(R general, T general, SS)

428-R. Aluminum "Self-Stops" Corrosion. C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr. *Steel,* v. 133, Sept. 7, 1953, p. 134-136.

Paper presented at 1953 meeting of National Association of Corrosion Engineers, Chicago. Outdoor weathering test results. Graphs. (R3, Al)

429-R. Water Treatment for Corrosion Control. G. B. Hatch. *Steel,* v. 133, Sept. 21, 1953, p. 181, 183, 187-188, 194.

Treatment by removal or neutralization of factors favoring corrosion or by reinforcing inhibitors. Photographs, graph. (R10)

430-R. Some Observations on the Causes and Prevention of Kraft Digester Corrosion. Edwdard W. Hopper. *Tappi,* v. 36, Aug. 1953, p. 345-352.

Variables in the steel, liquor and circulation which may influence corrosive or erosive attack. Results of chemical, spectroscopic and microscopic examination of digester steel samples. Method used in increasing the life of seriously thinned digesters. Tables, micrographs. (R7, CN)

431-R. (English.) **The Relationship Between the Work Function of a Metal and Its Energy of Activation for Oxidation.** A. F. H. Ward and N. R. Bharucha. *Recueil des travaux chimiques des Pays-Bas,* v. 72, no. 8, Aug. 1953, p. 735-738.

Correlation coefficient is fairly constant with a tendency to decrease slightly with increased atomic number. 27 ref.
(R2, P15, Cr, Cu, Co, Fe, Pt, W, Ni, Ag, Au, Sn)

432-R. (French.) **Microscopic and Interferometric Observations of Corrosion Figures and Their Interpretation by Means of Dislocations.** R. Gevers. *Journal de chimie physique,* v. 50, no. 5, May 1953, p. 321-328.

Importance of Burgers dislocations in the corrosion phenomenon. Topaz and SiC crystals were studied. Micrographs. 15 ref. (R11)

433-R. (French.) **Corrosion of a Light Alloy by an Electrolytic Couple.** Pierre A. Jacquet. *Revue de l'Aluminium,* v. 30, no. 200, June 1953, p. 217-224.

Metallographic examination and corrosion tests proving that the alloy was sensitized to channeling corrosion. Tables, micrographs. 7 ref. (R1, Mg, Al, Zn)

434-R. (German-French.) **A Traveling Radio Tower.** *Aluminium Suisse,* v. 3, no. 4, July 1953, p. 136-138.

Corrosion resistance and performance of a radio tower made of "Anticorodal" in 1939. Photographs. (R3, T1, Al)

435-R. (German.) **Influence of Customary Cooling Agents on Aluminum Alloys.** H. Kessler. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 315-317.

Results of laboratory experiments to determine corrosive effects. (R2, Al)

436-R. (German.) **Results of Dew-Point Measurements in High-Pressure Boilers.** F. Henning and H. Rögener. *Brennstoff-Wärme-Kraft,* v. 5, no. 8, Aug. 1953, p. 269-272.

Evolution of device for determining dew point from electrical conductivity of moisture precipitated. Proven cases of corrosion were attributable to exceeding the dew point. Photographs, diagrams. 6 ref. (R4)

437-R. (German.) **Anticorrosive Grounding Colors for Magnesium.** *Metall,* v. 7, nos. 15-16, Aug. 1953, p. 617.

Tests of chromate paints to determine solubility in seawater. (R4, Mg)

438-R. (German.) **Intercrystalline Stress Corrosion of Non-Alloyed and Low-Alloyed Steels and Its Prevention by Additions of Titanium or Tantalum-Niobium.** Ewald Baerlecken and Walter Hirsch. *Stahl und Eisen,* v. 73, no. 12, June 1953, p. 785-789.

Test methods, alkali resistance, effect of welding and changes in structure. Photographs, graphs. 9 ref. (R1, ST, AY)

439-R. (German.) **Cathodic Corrosion Protection of Steel and Iron.** Heinrich Klas. *Stahl und Eisen,* v. 73, no. 15, July 16, 1953, p. 971-974.

Principles and techniques. Tables, diagram, photograph. 13 ref. (R10, ST, CI)

440-R. (German.) **Corrosion and Protection Against Corrosion of Iron and Steel.** Heinrich Steinrath. *Stahl und Eisen,* v. 73, no. 17, Aug. 13, 1953, p. 1109-1116.

Survey of literature for the years 1950 and 1951. 262 ref. (R general, Fe, ST)

441-R. (German.) **Biological Corrosion of Iron and Steel.** Günther Seelmeyer. *Werkstoffe und Korrosion,* v. 4, no. 7, July 1953, p. 241-247.

Knowledge and theory; lists preventives. Diagrams, tables. 33 ref. (R1, CI, ST)

442-R. (German.) **Attack of Platinum by Hydrogen Chloride.** H. v. Wartenberg. *Zeitschrift für anorganische und allgemeine Chemie,* v. 273, nos. 1-2, July 1953, p. 91-95.

Corrosion products and effects of other chlorides. 3 ref. (R6, Pt)

443-R. (German.) **Solution of Iron in Nitric Acid.** T. G. Owe Berg. *Zeitschrift für anorganische und allgemeine Chemie,* v. 273, nos. 1-2, July 1953, p. 101-112.

Dependence of saturation value and beginning and final velocities on concentration of acid, temperature, acid volume, sample surface and stirring was determined. Interrelationships. Graphs, tables. 13 ref. (R5, Fe)

444-R. (German.) **Mechanism of Fissure Formation in Stress Corrosion of Homogeneous Solid Solutions. II. Intercrystalline Fissure Formation of a Hard-Rolled Silver-Gold Alloy as a Function of Extent of Recrystallization.** Ludwig Graf and Gertrud Fahrner. *Zeitschrift für Metallkunde,* v. 44, no. 7, July 1953, p. 302-306.

A 33.3 wt. % Au alloy was used. Photographs, graphs, diagrams. 10 ref. (R1, Au, Ag)

445-R. (Italian.) **The Corrosion Resistance of Aluminum and Its Alloys in Industrial Atmospheres.** G. Luft and A. Perrone. *Alluminio,* v. 22, no. 3, Mar. 1953, p. 256-269.

Results of corrosion resistance tests on coated or unprotected specimens. Tables, graphs, photographs, micrographs. (R3, Al)

446-R. (Italian.) **Stainless Steel Research Work. III. Passivity of 18-8 Austenitic Steels.** A. Ferri. *Metallurgia italiana,* v. 45, no. 6, June 1953, p. 203-207.

Effect of the superficial state of the metal and crystallographic orientation on passivity. Tables, graphs, photographs, diagrams. 20 ref. (R10, SS)

447-R. (Polish.) **Polarographic Method of Examining Corrosion of Steel.** St. Minc. *Przemysl Chemiczny,* v. 8, no. 10, Oct. 1952, p. 443-447.

Optimum conditions for using changes in the magnitude of O_2 wave for classifying steel according to its anticorrosive properties. Graphs, tables, diagram. 9 ref. (R11, ST)

448-R. (Russian.) **Overpassivation of Steels in Oxidizing Media.** V. P. Batrakov and G. V. Akimov. *Doklady Akademii Nauk SSSR,* v. 89, no. 2, Mar. 11, 1953, p. 321-323.

Corrosion stability of 0.1% carbon steel and 0.3% C low-alloy chrome steel in HNO_3 of high concentration. Graphs. 7 ref. (R10, CN, AY)

449-R. (Spanish.) **Stainless Steel in the Chemical Industry.** Luis Jansana. *Afinidad,* v. 29, nos. 119-120, Nov.-Dec. 1952, p. 521-527.

Corrosion resistance of various stainless steels. Tables. (R general, SS)

450-R. (Book.) **Corrosion—A Short Course.** 148 p. Feb. 1952. Dept. of Conf. & Spec. Activities, University Extension, University of California Press, Los Angeles 24, Calif. $2.00.

Consists of 25 lectures covering corrosion costs and control, nonferrous metals, soils, and coatings. (R general)

451-R. (Book.) **Symposium on Conditioning and Weathering.** ASTM Special Technical Publication, no. 133, 98 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $2.25.

Consists of 10 reports presented at ASTM 50th Anniversary Meeting, New York, June 24, 1952. (R3)

S

Inspection and Control

330-S. Radiography and Cobalt-60. G. J. Barker. *American Foundryman,* v. 24, Aug. 1953, p. 44-46.
Reactions and use of Co-60 in testing foundry castings. Safety precautions. Photographs. (S13, S14, S15)

331-S. Segregates—Determination of Metal Compositions by Spectrographic Analysis. Kazuo Yasuda. *Castings Research Laboratory, Report,* no. 4, 1953, p. 63-65.
Segregation of Mn and Si in cast iron was determined. Graphs. (S11, CI)

332-S. Paint Coating Thickness Meters. II. R. Quarendon. *Engineer,* v. 196, Aug. 7, 1953, p. 162-166.
Includes instruments for coatings on magnetic, nonmagnetic conducting and nonconducting materials. Diagrams, photographs. (S14, L26)

333-S. Testing Frame for Ships' Structures. *Engineering,* v. 176, July 24, 1953, p. 115-116.
Testing frame and its use. Photograph. (S21)

334-S. Industrial Radiography. R. E. MacDonald. *Engineering Journal,* v. 36, Aug. 1953, p. 1003-1011.
Factors involved in industrial radiography. A more detailed description of the radiographic procedure is given, particularly the inspection of new all-welded destroyer escort vessels. Photographs. 17 ref. (S13, S14, S15)

335-S. Oxygen Measurement. Owen K. Seffern. *Instruments,* v. 26, Aug. 1953, p. 1211-1216.
Direct oxygen measurement using the paramagnetic technique. Brief explanations of other common methods. Diagrams, photographs. (S11)

336-S. Cut Engineering Costs With High Speed Motion Pictures. A. E. Ground. *Iron Age,* v. 172, Aug. 27, 1953, p. 97-100.
High-speed camera for use in metal-working operations. Photographs. (S general)

337-S. An Interferometer for Examining Polished Surfaces. Ronald E. Sugg. *Mechanical Engineering,* v. 75, Aug. 1953, p. 629-631.
Paper presented at the Spring Meeting of the ASME, Columbus, Ohio, Apr. 28-30, 1953. Multiple-beam interferometer which is portable and suitable for use wherever the examination of fine surface detail is required. Diagrams. (S15, Al, Cr, CI)

338-S. A New Standard for Spline Gaging. George L. McCain and Albert S. Beam. *Standardization,* v. 24, Aug. 1953, p. 228-236.
Details of spline and gaging standards, primarily for use with involute splines. Diagrams, tables. (S22)

339-S. Immersion Ultrasonic Inspection. The Development of a New Technique. Thomas A. Dickinson. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 296-297, 308.
Equipment based on the "echo" principle. Photographs. (S13, S14)

340-S. Magnaflux for Quality Control of Pipe-Line Welds. George L. C. Dehn. *Welding Journal,* v. 32, Aug. 1953, p. 721-727.
Presented at National Spring Meeting, AWS, Houston, Tex., June 16-19, 1953. Need for quality control type of current, inspection procedure and typical defects. Diagrams, photographs. (S13, CN)

341-S. (German.) **Testing Apparatus for Anodic Coatings.** *Aluminium Ranshofen, Mitteilungen,* 1953, no. 1, Apr. p. 6-8.
Apparatus for nondestructive testing of anodic coatings on Al. Measurement of transmissivity is basic principle. Photograph, diagrams. (S13, S14, S15, Al)

342-S. (German.) **Surface Testing With the Interference Microscope.** W. Illig. *Metalloberfläche,* Ausgabe A, v. 7, no. 7, July 1953, p. 97-104.
Principle of the interference method and how to evaluate resulting recordings. Diagrams, photographs. (S15)

343-S. Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys. Jerome Strauss, chairman, *American Society for Testing Materials,* Preprint no. 6, 1953, 7 p.
Recommendations and revisions of standards and specifications covering stainless steel wire strands. Table. (S22, SS)

344-S. Report of Committee B-1 on Wires for Electrical Conductors. D. Halloran, chairman, *American Society for Testing Materials,* Preprint no. 7, 1953, 18 p.
Recommendations and revisions of standards and specifications. Tables. (S22, Ti, Cu)

345-S. Report of Committee B-2 on Non-Ferrous Metals and Alloys. Bruce W. Gonser, chairman, *American Society for Testing Materials,* Preprint no. 8, 1953, 2 p.
Recommendations for revision of specifications. (S22, EG-a)

346-S. Report of Committee B-4 on Electrical Heating, Resistance, and Related Alloys. S. A. Standing, chairman, *American Society for Testing Materials,* Preprint no. 10, 1953, 7 p.
Recommendations and revisions of specifications for high-resistivity, low-temperature-coefficient wire. (S22, Cu, SG-q)

347-S. Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. G. H. Harnden, chairman, *American Society for Testing Materials,* Preprint no. 11, 1953, 10 p.
Recommendations and revision of specifications affecting standards for Cu. Tables. (S22, Cu)

348-S. Report of Committee B-6 on Die-Cast Metals and Alloys. W. Babington, chairman. *American Society for Testing Materials,* Preprint no. 12, 1953, 8 p.
Revision of specifications. Tables. (S22, E13, Al, Cu, Zn)

349-S. Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. I. V. Williams, chairman. *American Society for Testing Materials,* Preprint no. 13, 1953, 11 p.
Revisions of specifications. Tables. (S22, Al, Mg)

350-S. Ultrasonic Inspection of Welded Pressure Vessels. *Engineer,* v. 196, Aug. 14, 1953, p. 199-202.
Ultrasonic techniques in the inspection of plates and welded pressure vessels. Diagrams, graphs. (S13, K9)

351-S. Ultrasonic Testing of Castings. Thomas A. Dickinson. *Foundry,* v. 81, Sept. 1953, p. 221-222, 224, 226.
"Immersion" testing technique which detects internal flaws in all but the most porous types of castings. Diagram. (S13)

352-S. Ultrasonic Methods of Inspection. M. H. Baddeley. *Foundry Trade Journal,* v. 95, Aug. 27, 1953, p. 261-264, 274.
Scientific principles involved in ultrasonics. Short history of the application of the phenomena to flaw detection and types and uses of instruments. Diagrams, photographs. 4 ref. (S13)

353-S. Ultrasonic Testing of Welded Pressure Vessels. *Industrial Chemist and Chemical Manufacturer,* v. 29, Sept. 1953, p. 394-396.
New method. Faults are found in metal plates over ⅜ in. thick. Both probes are placed on the same side of the plates. (S13)

354-S. Radioisotopes in Industry. Philip Miller. *Industry and Power,* v. 65, Sept. 1953, p. 72-75.
Fission products and their uses in drug sterilization, food processing, polymerization, phosphor activation and testing devices. Graph, photographs, tables. (S19)

355-S. Testing Electrical Instruments. F. D. Weaver. *Instruments,* v. 26, Sept. 1953, p. 1362-1363, 1408-1410, 1412.
Methods, equipment and simple circuits for standardizing electrical instruments. Diagrams. 9 ref. (S22)

356-S. Cesium Radio Isotope. New Tool for Parts Inspection. J. M. Thompson and P. A. Glenn. *Iron Age,* v. 172, Sept. 10, 1953, p. 174-176.
Properties, uses and precautions necessary for use of Cs^{137} as inspection tool. Graphs, diagrams, photographs. (S19)

357-S. A Maintenance Material Program. J. E. Anderson and J. B. Whitlock. *Iron and Steel Engineer,* v. 30, Sept. 1953, p. 75-81; disc., p. 81-82.
Causes and prevention of failures in equipment. Photographs, tables. (S21)

358-S. Detection of Microcracks in Steel. W. L. Jensen and R. F. Campbell. *Journal of Metals,* v. 5, sec. 2, Sept. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1222.
Micrographs. (S13, CN)

359-S. How Size Tolerances Affect Gaging Requirements. Earle Buckingham. *Machinery,* v. 60, Sept. 1953, p. 176-185.
Size, form, position and functioning of a product. Diagrams. (S14)

360-S. Units for Measuring Variations in Measurements. W. J. Youden. *Metal Progress,* v. 64, Sept. 1953, p. 91-96.
Value of statistics in precision measurements. Photograph. (S12)

361-S. Profiloscope for Wire Drawing Die Inspection. *Metallurgia,* v. 48, no. 286, Aug. 1953, p. 101-102.
Theory and operation of new instrument for rapid quality control. Photographs. (S14)

362-S. Inspection Methods Keep Output of Flying Boxcars "on Target". Arthur H. Allen. *Metal Progress,* v. 64, Sept. 1953, p. 97-104.
Distinctive design of the plane with specialized functional characteristics, original and efficient manufacturing-assembly concept, and system of quality control. Photographs. (S general, T24)

363-S. Some Applications of High-Power Ultrasonics in the Metal Industries. E. A. Neppiras. *Metal Treatment and Drop Forging,* v. 20, Sept. 1953, p. 391-398.
Use in mechanical testing, machining, surface cleaning, and soldering. Diagrams, photographs, micrograph. (S13, G17, L10, K7)

364-S. The Art of Radiography. Norman C. Miller. *Nondestructive Testing,* v. 11, Sept. 1953, p. 11-15.
Equipment and techniques for inspecting unusual and difficult structures. Photographs, diagrams. (S13, S14, S15)

365-S. Report on the Investigation of Betatron Radiographic Techniques. Clark J. Smith. *Nondestructive Testing,* v. 11, Sept. 1953, p. 17-22.
Results of five investigations on

essential phenomena that must be considered in good practice. Photographs, charts. (S13)

366-S. Gamma Radiography With "Pentatron". *Nondestructive Testing,* v. 11, Sept. 1953, p. 23-25.

Equipment for safe handling of radioactive isotopes used in nondestructive testing. Photographs, diagrams. (S19)

367-S. Properties of Some Radioactive Isotopes Useful in Radiography. Jerome Kohl. *Nondestructive Testing,* v. 11, Sept. 1953, p. 33-37.

Important radiographic properties of several materials to aid in selection of radiation sources for nondestructive testing. 12 ref. (S19)

368-S. A New Non-Destructive Test for Welded Varnish Plant. H. Manley. *Paint Manufacture,* v. 23, Sept. 1953, p. 293-294.

Ultrasonic testing of welds. (S13)

369-S. Porosity of Electrodeposited Metals. XII. Measurement of Surface Roughness and Its Change in Exposure. N. Thon, Ling Yang and Stella Yang. *Plating,* v. 40, Oct. 1953, p. 1135-1137.

Method of obtaining true specific surface area of a solid. Diagrams. 2 ref. (S15, L17)

370-S. Seven Methods for Solving Structural Test Problems. Warren W. Bradley. *Product Engineering,* v. 24, Sept. 1953, p. 172-176.

Hydraulic jack loading, proportioning valve, dead weight tests, wear testing, drop testing, bending test on closed sections and vacuum test of pressure vessels. Diagrams, photographs. (S21)

371-S. Proving Ground Moves Indoors. L. W. Fischer, R. W. Roush, and E. B. Stavely, Jr. *SAE Journal,* v. 61, Sept. 1953, p. 57-60.

Excerpts from paper presented at SAE Annual Meeting, Detroit, Jan. 12, 1953. Equipment and methods for testing axles. Diagrams, graphs, photographs. (S21)

372-S. The Problems of Furnace Control. I. Leo Walter. *Steel Processing,* v. 39, Sept. 1953, p. 450-454, 469.

Fundamentals of automatic high temperature and combustion control. Diagrams. (To be continued.) (S16)

373-S. Optical Methods Simplify Tooling Problems. Andrew E. Rylander. *Tool Engineer,* v. 31, Sept. 1953, p. 42-46.

Various apparatus and methods to simplify work in airframe fabrication. Photographs, diagrams. (S13, S14, S15)

374-S. Continuous Gaging for Machine Control. Albert C. Sanford. *Wire and Wire Products,* v. 28, Sept. 1953, p. 877-878, 925-926.

Various methods of gaging bare and plastic coated wire conductors to determine off-size and lack of uniformity in outside diameters. Photographs. (S14)

375-S. (English.) Specifications of the Products Made by the CIA. De Acero Del Pacifico, Talcahuano, Chile. Oscar Herrera. Bogota Conference, 1952. ST/ECLA/CONF. no. 1/L.80, 1952, 5 p. Published jointly by ECLA-TAA for United Nations.

Tables showing chemical composition, physical properties and usual dimensions of products. Tables. (S22, CI)

376-S. (French.) Testing Methods for Evaluating the Brilliance of Aluminum Sheets. J. Herenguel and J. Boghen. *Revue de metallurgie,* v. 50, no. 5, May 1953, p. 317-327.

Method yielding a concrete classification figure. Results obtained with visual examination and reflection measurement by means of photoelectric cell. Diagrams, micrographs, tables. (S15, Al)

377-S. (German.) Fracture Coefficient and Thickness of Thin Anodically Produced Aluminum Oxide Layers. R. Bahn and O. Böttger. *Zeitschrift für Physik,* v. 135, no. 4, July 1953, p. 376-379.

Determination by two interferometric methods. Density did not increase linearly with oxidation stress. Fracture coefficent was constant. Graphs, diagram. 6 ref. (S14, L19, Q26, Al)

378-S. (Italian.) The Density and the Gravimetrically Determined Thickness of Anodic Coatings. A. Prati. *Alluminio,* v. 22, no. 2, 1953, p. 148-151.

Weights determined directly by means of a hydrostatic balance, and indirectly from the weight value determined according to the method of ASTM B137-45. Thickness was measured by an Abbe unit. Tables. 4 ref. (S14, L19)

379-S. (Spanish.) Notes on Steel Specifications for Different Uses. Federico Frick. Bogota Conference, 1952. ST/ECLA/CONF. no. 1/L.78, 1952, 75 p. Published jointly by ECLA-TAA for United Nations.

Classification of steels based on chemical composition and mechanical properties. (S21, ST)

380-S. (Spanish.) Evaluation of Arc-Welded Structure by Non-Destructive Methods. Mariano de Izuzquiza. *Ciencia y técnica de la Soldadura,* v. 3, no. 12, May-June 1953, 12 p.

Magnetic, ultrasonic, and radiographic nondestructive testing methods. Diagrams. 6 ref. (S13, Fe, Al, Cu)

381-S. (Swedish.) Temperature Measurement in Melts of Copper Alloys. Morris Itzel. *Gjuteriet,* v. 43, no. 7, July 1953, p. 127-132.

Advantages and disadvantages of various types of thermometers for thermo-electric measurements. Thermocouples, millivoltmeters and potentiometers. Diagrams. 3 ref. (S16, Cu)

382-S. (Book.) ASTM Standards on Copper and Copper Alloys. 542 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $5.00 paper-bound; $5.65 clothbound.

Presents 115 specifications, test methods, and recommended practices pertaining to Cu and Cu alloy castings, sheet, strip, bars, shapes, wire, pipe and tube, filler metal, and covered steel electrical conductors. Specifications are given for other nonferrous metals including Zn, Pb, Ni, phosphor-Cu, and Si-Cu. (S22, Cu, Zn, Pb, Ni)

383-S. (Book.) Non-Destructive Testing. Horace Manley. 1953. The Association of Engineering and Shipbuilding Draughtsmen, London. 3s.

Mainly concerned with testing of metals but covers ceramics and other structural materials. Peculiarities of various techniques are discussed. (S general, Q general)

T Applications of Metals in Equipment

269-T. Ornamental Aluminum Casting. *Canadian Metals,* v. 16, Aug. 1953, p. 22, 24.

Use of aluminum castings in ornamental work. Photographs. (T9, Al)

270-T. Aluminum Construction. *Canadian Metals,* v. 16, Aug. 1953, p. 52, 54.

Constructional aspects of Al in building, electrical and transportation industries. Photographs. (T general, Al)

271-T. Modern Ferrous Materials for Springs. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 25, Aug. 1953, p. 71-74.

Principal modern ferrous materials for springs, their characteristics and suitability for particular purposes. (T7, AY, SS)

272-T. Industrial Uses of the Rarer Metals and Their Alloys. A. R. Myhill. *Mechanical World and Engineering Record,* v. 133, Aug. 1953, p. 353-357.

Uses of Be, Bi, Cb, Cd, Co, Ge, Pt, Pd, Ir, Rh, Ru, Os, Mg, Ti, W, Ta, V, Mo, and Zr. (T general, EG-b)

273-T. Efficient Structures in Aluminium. M. Bridgewater. *Metal Industry,* v. 83, Aug. 7, 1953, p. 105-108.

British specifications and design data for Al structural members. Photographs, diagrams. (T26, S22, Al)

274-T. The Building of a Nuclear Reactor. B. A. Rogers. *Metal Progress,* v. 64, July 1953, p. 92-96.

General review of properties of U affecting construction of a reactor. Diagrams. (T25, U)

275-T. Aluminum on the Farm. *Modern Metals,* v. 9, Aug. 1953, p. 35-36, 38-40, 42-43.

Applications of Al in farm equipment. Photographs. (T3, Al)

276-T. Good Design in Gas Meters. *Modern Metals,* v. 9, Aug. 1953, p. 52-53.

Use of Al die castings for meters. (T8, Al)

277-T. Dome of the Future. *Modern Metals,* v. 9, Aug. 1953, p. 64, 66.

Use of Al struts to construct dome in rotunda of Ford plant. Photographs. (T26, Al)

278-T. Aluminum Roofing. Custom Made at the Job. *Sheet Metal Worker,* v. 44, Aug. 1953, p. 88, 90.

Installation of tailor-made Al roofing. (T26, Al)

279-T. Unique Application of Sheet Copper Roofs on Home. James F. Redding. *Sheet Metal Worker,* v. 44, Aug. 1953, p. 82, 124.

Technique of combining small soft sheet Cu panels which are locked to form a whole coverage. (T26, Cu)

280-T. Stainless Steel Industrial Equipment. *Welding and Metal Fabrication,* v. 21, Aug. 1953, p. 272-276.

Fabrication of a wide range of stainless steel equipment. Material preparation, metallic arc welding process, grinding and finishing. Photographs. (T general, K1, G18, SS)

281-T. The Use of Structural Quality Steel in Pressure Vessels. I. E. Boberg. *Welding Journal,* v. 32, Aug. 1953, p. 413s-416s.

Evaluates available steels as to comparative properties and suitability for welded pressure vessel construction. Tables. (T26, ST)

282-T. (German.) Corrugated and Ornamental Sheets. *Aluminium Ranshofen, Mitteilungen,* 1953, no. 1, Apr. p. 13.

Corrugated sheets produced from "Dekoral TT", a new ornamental sheet of pure Al and a new knurled foil for insulation purposes. Photograph, diagrams. (T9, Al)

283-T. (German.) Hardened Lead Metals for Bearings. R. Weber. Paper from "Werkstoffe für Gleitlager." Springer-Verlag, OHG Berlin, p. 97-132.

Composition, physical, mechanical and chemical properties and metallurgical behavior. Graphs, tables. (T7, Pb)

284-T. (German.) Alloys Containing Cadmium as the Principal Component. R. Weber. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 133-151.

Composition, physical, mechanical and chemical properties and metallurgical behavior. Use for bearings. Graphs, tables. (T7, Cd)

285-T. (German.) **Alloys Containing Aluminum and Magnesium as Principal Components.** W. Bungardt. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 152-203.

Alloying suggestions. Formation of light alloy bearings. Graphs, tables, micrographs. (T7, Al, Mg)

286-T. (German.) **Alloys Containing Silver as the Principal Component.** H. Mann. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 204-209.

Development and structure of Ag alloys for bearings. (T7, Ag)

287-T. (German.) **Alloys Containing Zinc as the Principal Component.** E. Martin. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 210-232.

Compositon, physical and mechanical properties and results of tests made on the bearings. Graphs, tables. (T7, Zn)

288-T. (German.) **Alloys Containing Copper as the Principal Component.** H. Mann. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 233-318.

Use of bronze and red, yellow, and Pb brasses for bearings. Graphs, tables, micrographs. (T7, Cu, Pb)

289-T. (German.) **Sintered Metal.** H. Wiemer. Paper from "Werkstoffe für Gleitlager." Springer-Verelag OHG, Berlin, p. 319-356.

Composition, physical, mechanical and friction properties of powdered metal bearings. Requirements for impregnation and examples of application. Graphs, tables, micrographs. (T7, H general, Cu, Sn, Al)

290-T. (German.) **Cast Iron.** W. Meboldt and R. Kühnel. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 357-364.

Mechanical properties, machining and lubrication of cast iron bearings. Diagrams. (T7, CI)

291-T. (German.) **Alloys Containing Lead and Tin as Principal Components.** W. Bungardt. Paper from "Werkstoffe für Gleitlager." Springer-Verlag OHG, Berlin, p. 35-96.

Composition of principal white metals for bearings. Structure and metallurgical, physical and mechanical properties. Graphs, tables, micrographs. (T7, Pb, Sn)

292-T. The Trend of Complete Aircraft and Guided-Missile Structures Toward Reinforced Plastics. William E. Braham. *Aeronautical Engineering Review,* v. 12, Sept. 1953, p. 37-40, 45.

Compares properties of various metals and plastics for use in aircraft. Graphs. (T24)

293-T. AMC to Test All-Magnesium F-80C. Irving Stone. *Aviation Week,* v. 59, Sept. 28, 1953, p. 28-30.

All-Mg structure of two types of light aircraft. Photographs. (T24, Mg)

294-T. Printing Metals. I. The Elementary Metals and Basic Alloys and Their Working Properties. Leslie G. Luker. *British Printer,* v. 66, Sept.-Oct. 1953, p. 64, 65-66.

Data on Pb, Sb, and Sn. Photomicrographs. (T9, Pb, Sb, Sn)

295-T. Aluminum-on-Steel Bearings. J. B. Mohler. *Diesel Power,* v. 31, Sept. 1953, p. 38-41.

High-strength bearing alloys; design data on Al-lined steel bearings. Photographs, tables, micrographs. (T7, Al)

296-T. Steam Piping, Valves for 1100° F. Service. Frank A. Ritchings and Sabin Crocker. *Heating, Piping & Air Conditioning,* v. 25, Sept. 1953, p. 82-88.

Reviews existing data and speculates on whether low-alloy content ferritic steels could be made to serve the purpose. Graphs, tables. 32 ref. (T27)

297-T. Developments in Steel Castings in the Heavy Power Plant Industry. F. Buckley. *Institution of Mechanical Engineers, Proceedings,* sec. A, v. 167, no. 2, 1953, p. 177-183; disc., p. 183-187.

Developments in the science of foundry production and practice. Trends in the application of castings in heavy prime movers and power generators. Photographs, diagrams. (T25, E general)

298-T. Aluminum Alloys Make Good Bearings. D. B. Wood. *Iron Age,* v. 172, Sept. 10, 1953, p. 168-169.

Photographs. (T7, Al)

299-T. Aluminum-Antimony Alloy Has Wide Applications in Electronics. Elliot L. Lewis. *Light Metal Age,* v. 11, Aug. 1953, p. 11, 28.

Use to replace Ge and Si in transistors, rectifiers and other electronic devices. (T1, Al, Sb)

300-T. Making Precision Roller Chain. *Machinery (London),* v. 83, Aug. 28, 1953, p. 415-422.

Equipment and techniques developed for bush and rivet manufacture and various finishing processes. Photographs. (T7)

301-T. A New Non-Ferrous Die Material. *Machinery (London),* v. 83, Sept. 18, 1953, p. 569-571.

Properties and advantages of new Al bronze which has no affinity for other metals. Dies are particularly suited for forming stainless steels and Nimonic alloys. Photographs, diagrams. (T5, G general, Al, SS, Ni)

302-T. Metal-Clad Laminates Used in Printed Circuitry. Norman A. Skow. *Mechanical Engineering,* v. 75, Sept. 1953, p. 709-711, 714.

Materials, bonding, properties of Cu sheets, etching, fabrication, assembly, economy and applications. Photographs. (T1, K11)

303-T. Non-Ferrous Metals in Chemical Engineering. *Metal Industry,* v. 83, Sept. 4, 1953, p. 182-191.

Articles on "Copper and Copper Alloys", S. Baker; "Lead and Lead Alloys", D. S. Laidler; "Wrought Nickel-Molybdenum-Iron"; "Silver and the Platinum Metals", J. M. Pirie; and "Aluminium and Its Alloys", D. C. G. Lees. Photographs, tables. (T29, Cu, Pb, Ni, Ag, Al)

304-T. 100 Engineers Evaluate Atomic Power Plants. *Metal Progress,* v. 64, Aug. 1953, p. 97-107.

Studies made by four industrial groups on apparatus to produce Pu and power. Photographs, diagrams. (T25, Pu)

305-T. New Wheels for Faster Freight. *Metal Trends,* v. 1, no. 3, 1953, p. 1-6.

Development of 1.5% carbon freight car wheels. Graph, photographs. (T23, CI)

306-T. Big Aluminum Containers in Switzerland. Edwin J. Zimmerli. *Modern Metals,* v. 9, Sept. 1953, p. 33-36.

Containers range in size from small food cans to giant beer vats. Photographs. (T29, Al)

307-T. What's Ahead for Titanium Stampings. Carter C. Higgins. *Modern Metals,* v. 9, Sept. 1953, p. 38, 42.

Recent progress and outlook. Chief problem is high cost. Photographs. (T general, G3, Ti)

308-T. Boeing's Mighty Midget. *Modern Metals,* v. 9, Sept. 1953, p. 44, 46.

Small gas turbine made mostly of Al. Photographs. (T25, Al)

309-T. Aluminum in a Vegetable Juicer. *Modern Metals,* v. 9, Sept. 1953, p. 48, 52.

Al is nontoxic, resists fruit and vegetable acids, and is cheaper than stainless steel. Photographs. (T29, Al, SS)

310-T. Calenders and Calender Rolls Today. Albert Seaton. *Paper Trade Journal,* v. 137, Oct. 2, 1953, p. 14-16, 18.

Casting and grinding of cast iron calender rolls for papermaking machines. Photographs, diagram. (T29, G18, E general, CI)

311-T. Guide for Selection of Carbon Steel Bars. I. G. P. Witteman. *Steel,* v. 133, Sept. 14, 1953, p. 104-107, 113.

Factors influencing proper selection to fit various needs. Photographs. (T general, CN)

312-T. Getting More for Your Steel Dollar. A. F. Stuebing. *Steel,* v. 133, Oct. 5, 1953, p. 90-92.

Advantages and savings using high-strength, low-alloy steels for transportation equipment. Photographs. (T21, T22, T24, AY)

313-T. Jet Engines Put Heat on Metals. William P. Brotherton. *Western Machinery and Steel World,* v. 44, Sept. 1953, p. 101-105.

Applications of heat resistant alloys in jet engines. Photographs, diagrams. (T25, SG-h)

314-T. Zirconium. From Rarity to Reactors. *Westinghouse Engineer,* v. 13, Sept. 1953, p. 171-173.

Properties and uses. Photographs. (T25, Q general, Zr)

315-T. (Czechoslovakian.) **Alloys for Fountain Pen Tips.** Jan Korecky. *Hutnické Listy,* v. 7, no. 8, Aug. 1952, p. 401-403.

Production of nibs without precious metals. Diagrams, micrographs. (T10, EG-c)

316-T. (French.) **Use of Aluminum in Electric Machines Operating on Alternating Current.** René Daguet. *Revue de l'Aluminium,* v. 30, no. 200, June 1953, p. 236-240.

Use of Al windings in electric motors. Photographs, diagrams. (T1, Al)

317-T. (French, German.) **Aluminum in the Construction of Motor Boats.** Emil Schacher. *Aluminium Suisse,* v. 3, no. 4, July 1953, p. 111-118.

Innovations in the construction of small ships in Switzerland. Photographs. (T22, Al)

318-T. (French, German.) **Installation and Calculation of Copper-Tube Radiant Heating.** A. Kollmar. *Pro-Metal,* v. 6, no. 33, June 1953, p. 167-183.

Pressure gradient, rate of water flow, heat radiation and heat loss. Sample calculations. Tables, diagrams, photographs. 14 ref. (T27, Cu)

319-T. (French, German.) **Structural Shapes in Building Construction.** *Pro-Metal,* v. 6, no. 33, June 1953, p. 185-190.

Manufacturing processes and varied applications for Cu alloys. Photographs. (T26, Cu)

320-T. (German.) **Replacement of Copper by Aluminum in High Current Bus Bars in Electrolytic Installations.** K. Kaizik. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 305-307.

New type of contacts. Economic advantages are claimed. Diagrams. 4 ref. (T1, Al, Cu)

321-T. (German.) **Aluminum Antimonide (Al Sb) as Rectifier Material.** G. Zielasek. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 308-309.

Significance of certain intermetallic compounds as rectifier materials. Diagrams, graph. 13 ref. (T1, Al, Sb)

322-T. (German.) **Heat Protection by Aluminum Foil.** W. Linicus. *Aluminium,* v. 29, nos. 7-8, July-Aug. 1953, p. 320-323.

Heat-resistant clothing and equipment made of Al foil and fabrics. Photographs, table. (T10, Al)

323-T. (German.) **Copper-Plated Aluminum in Electrical Engineering.** *Aluminium*, v. 29, nos. 7-8, July-Aug. 1953, p. 323-324.

Uses of "Cupal" in electrical engineering field. Photograph, graph. 3 ref. (T1, Al, Cu)

324-T. (German.) **Use of "Reflectal" in Construction of Reflectors.** R. Lattey. *Metall*, v. 7, nos. 15-16, Aug. 1953, p. 582-586.

Reports preference of low Mg content and extreme hardness. Tests covered variables such as "Eloxal" coatings, purity of Al and type of reflection sought. Photographs, graphs, tables. 5 ref. (T10, P17, Al)

325-T. (German.) **Metallographic Problems in Industrial Working of Gold.** Otto Loebich. *Zeitschrift für Metallkunde*, v. 44, no. 7, July 1953, p. 286-292.

Treatment of Au alloys for jewelry, dental, and other purposes. Pointers for minimizing damage. Photographs. 9 ref. (T9, T10, Au)

326-T. (German, French.) **Valuable Light-Metal Parts From Hot Pressed Aluminum Alloys.** R. Muller. *Aluminium Suisse*, v. 3, no. 3, May 1953, p. 83-89.

Advantages, qualities, uses, construction and structure. Tables, diagrams, photographs. (T general, Al)

327-T. (German, French.) **Light-Metal Use in the Refrigerator Industry.** E. Baumli. *Aluminium Suisse*, v. 3, no. 3, May 1953, p. 90-92.

Advantages of "Peraluman" alloys. Corrosion data. Tables, photographs. (T27, R general, Al)

328-T. (Book-German.) **(Materials for Journal Bearings.) Werkstoffe für Gleitlager.** R. Kühnel, editor. Rev. ed. 2. 454 p. 1952. Springer-Verlag, Berlin, Germany.

Composition and properties of various bearing alloys and nonmetallic bearing materials. (T7, Pb, Sn, Cd, Al, Mg, Ag, Zn, Cu)

V

Materials

General Coverage of Specific Materials

108-V. Production and Utilisation of Titanium and Zirconium. H. W. Worner. *Australasian Engineer*, 1953, July, p. 46-50.

Extraction, melting, fabrication, properties and applications. Table, charts. 11 ref. (Ti, Zr)

109-V. The Properties and Applications of Corronel B. *Industrial Chemist and Chemical Manufacturer*, v. 29, Sept. 1953, p. 397-399.

Alloy composed of 66% Ni, 28% Mo and 6% Fe. Methods of working and uses. Tables. (Ni)

110-V. Selenium. A Scarce By-Product Metal. *Mining Journal*, v. 241, Aug. 28, 1953, p. 241-242.

Uses and recovery processes. (T general, C general, Se)

111-V. (Portuguese.) **Boron Steels: Their Principal Metallurgical Characteristics and Industrial Applications.** Luiz C. Correa da Silva. *ABM (Boletim da associacao brasileira de metais)*, v. 9, no. 30, Jan. 1953, p. 109-140.

Production details, metallurgical characteristics, tempering and mechanical properties and industrial application. Tables, graphs. 8 ref. (Q general, J29, T general, B, AY)

Be Fully Informed about

TOOL STEELS

Own your own copy

of the book

"TOOL STEELS"

by

J. P. Gill
R. B. George
G. A. Roberts
H. G. Johnstin

Chapters on Manufacture, Classification, Testing, Selection, Heat Treatment, and on each principal type of tool steel.

578 pages
277 illustrations
564 references in bibliography
$7.50

AMERICAN SOCIETY FOR METALS
7301 Euclid Ave., Cleveland 3, Ohio

HERE'S HOW . . .

To get copies of articles annotated in the A.S.M. Review of Current Metal Literature

Two alternative methods are:

1. Write to the original source of the article asking for tear sheets, a reprint or a copy of the issue in which it appeared. A list of addresses of the periodicals annotated is available on request.

2. Order photostatic copies from the New York Public Library, New York City, from the Carnegie Library of Pittsburgh, 4400 Forbes St., Pittsburgh 13, Pa., or from the Engineering Societies Library, 29 West 39th St., New York 18, N. Y. A nominal charge is made, varying with the length of the article and page size of the periodical.

Write to Metals Review for free copy of the address list

METALS REVIEW

7301 Euclid Avenue **Cleveland 3, Ohio**

STATEMENT OF THE OWNERSHIP, MANAGEMENT AND CIRCULATION, REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933 AND JULY 2, 1946 (39 U. S. C. 233) OF METALS REVIEW

PUBLISHED MONTHLY AT CLEVELAND, OHIO

FOR OCTOBER 1, 1953

1.—The names and addresses of the publisher, editor, associate editor, and business manager are: Publisher, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio; Editor, M. R. Hyslop, 7301 Euclid Ave., Cleveland; Associate Editor, Betty A. Bryan, 7301 Euclid Ave., Cleveland; Business Manager, W. H. Eisenman, 7301 Euclid Ave., Cleveland.

2.—The owner is: The American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio, which is an educational institution, the officers being: President, Ralph L. Wilson; Vice-President, J. B. Austin; Secretary, W. H. Eisenman; Treasurer, R. L. Dowdell; Trustees: John Chipman, George A. Roberts, H. B. Knowlton, J. B. Johnson, and A. O. Schaefer. All officers as above, 7301 Euclid Ave., Cleveland 3, Ohio.

3.—The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4.—Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bonafide owner.

Marjorie R. Hyslop, Editor

Sworn to and subscribed before me this 1st day of October, 1953. (Seal) Genevieve G. Fitzgerald, Notary Public. (My commission expires March 26, 1955.)

EMPLOYMENT SERVICE BUREAU

The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A.S.M. Ads are limited to 50 words and only one insertion of any one ad. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, O., unless otherwise staed.

POSITIONS OPEN

East

METALLURGIST: Ball bearing company requires a recent graduate B.S. in metallurgy and mechanical or chemical engineering for laboratory research on heat treatment for bearing applications and manufacturing problems. Excellent opportunity for man interested in progressing by initiative, scientific curiosity and ability to analyze and report on technical problems. Box 11-5.

TECHNICAL MEN: A progressive specialty steel company located in East is organizing a research and development laboratory and needs several competent junior and senior technical men capable of filling responsible positions. Box 11-10.

PHYSICAL METALLURGISTS: Recent graduates with bachelor's and with advanced degrees desired for expanding research program on copper, titanium and other metals. Opportunity for permanent position with progressive and successful company in Southern New England. Please give details of education, experience and interest. Box 11-15.

PLANT MANAGER: For leading commercial heat treating concern. Must have thorough metallurgical knowledge, wide practical experience in heat treating, outstanding judgment and ability in planning and production management. Only man of proven high qualifications considered. Applicants send full record, personal description, snapshot photo and salary expected. Box 11-115.

MANUFACTURER'S REPRESENTATIVES: To represent new product line in gamma radiography. Several territories open countrywide. Applicants should have successful selling record. Also have experience, or ability to acquire background, in field of industrial radiography. Write: Technical Operations, Inc., Arlington, Mass.

METALLURGIST: With aptitude for research and development in field of high alloy steels. Prefer man with laboratory experience, possessing sound background in phyical metallurgy, capable of writing clear, concise reports. Opportunities for professional development thr ugh recognized authorities. In reply indicate training, experience, military status and salary requirements. Box 11-120.

PHYSICAL METALLURGIST: B.S. degree, to conduct research and/or Ph.D. to be group leader. Research on heat treatment and phase studies of cermets. Attractive college community with housing. Opportunity for graduate work while employed full time. Salary open. Send resume of qualifications, experience, salary expected. Box 11-135.

Midwest

PHYSICAL METALLURGIST: Experienced in use of optical metallographic, X-ray diffraction and electron miscroscope equipment, especially as applied to solving problems in nonferrous metallurgy. Please contact: Dr. Kingsley, Research Div., Bohn Aluminum & Brass Corp., 8007 Jos. Campau, Detroit, Mich. Phone TRinity 5-6420.

WELDING ENGINEER: Capable of conducting research and demonstrating all recent advances in joining of nonferrous alloys. Sound theoretical background is desired, but ability to demonstrate and teach others to apply practical methods also required. Contact: Dr. Kingsley, Research Div., Bohn Aluminum & Brass Corp., 8007 Jos. Campau, Detroit, Mich. Phone TRinity 5-6420.

METALLURGIST: M.S. or Ph.D. degree. Age 28 to 38 with minimum of five years experience in industrial metallurgy. Aluminum experience necessary. Must have proven administrative ability and experience. Will work in capacity of technical assistant to chief metallurgist and be responsible for administration of laboratory. Write: Salaried Personnel Dept., Reynolds Metals Co., 2000 S. Ninth St., Louisville, Ky.

PRODUCTION METALLURGIST: Experienced, for alloy steel melting operation. Box 11-20.

MANAGER: With technical background, to manage small alloy steel foundry in Michigan. Box 11-25.

METALLURGIST: Young, for position in steel mill metallurgy laboratory. Detroit area. Metallurgical experience in alloys and stainless steel required. Salary commensurate with experience. Write: Rotary Electric Steel Corp., Box 4606, Detroit 34, Mich.

SALES ENGINEERS: In 25-35 age group. Metallurgical or engineering graduate preferred, for sales of nonferrous cast and wrought products by medium size manufacturer. Training period dependent on individual background, then assignment to sales territory. Income potential high for metal industry. Box 11-30.

A COMPREHENSIVE
METALLURGICAL INDEX

WHAT IT IS:

The ASM-SLA Metallurgical Literature Classification is a subdivided outline of the entire science of metallurgy that provides a guide to the filing and indexing of metallurgical literature and data collections. It can be used with standard card indexing and literature filing systems or with a specially designed punched-card system. The complete classification outline and instructions for its use are contained in a handy 8½ x 11 paper-bound booklet, selling for a dollar.

WHO MADE IT:

The classification was prepared by a joint committee of the American Society for Metals and the Special Libraries Association. Its authority, accuracy and completeness have been checked by experts in all branches of metallurgy.

WHAT DO I NEED?

First, the booklet containing the classification proper—essential for all purposes . . . *Second*, a set of looseleaf worksheets which provide capacity for the individual user to expand minor fields, to add new subjects, and to develop desired sidelines—essential only for the user who wishes more detail than provided in the existing outline . . . *Third*, Punched cards and punched-card equipment—a new and efficient bibliography filing method.

WHERE DO I GET IT?

The classification book and the Worksheets are available from the American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio. The punched cards and punched-card equipment may be purchased from Lee F. Kollie, Inc., 35 East Wacker Dr., Chicago 1, Ill.

For further details, write:

AMERICAN SOCIETY FOR METALS
7301 Euclid Avenue Cleveland 3, Ohio

The Metals Handbook

1332 Large Pages
1752 Illustrations
1057 Tables
803 Articles
1,620,000 Words
40,000 copies in use.

Here is a book without a competitor . . . a book 25 years in the making. The current, 7th edition of the Metals Handbook was compiled and written by 68 committees of the American Society for Metals; more than 500 metals engineers were hand picked by the Society as the top experts, the men best qualified to write the most authoritative possible reference book on metals, metal properties, fabrication and uses. The book they wrote is the Metals Handbook. It is divided into 37 principal sections, and contains 803 separate articles and data sheets on metals, metal shaping, forming, heat treating, welding, machining, foundry work, cleaning, finishing, testing, inspection, control and research techniques. All metals, all processes are included. The 64-page index and 4-page section on how to use the book make it easy for any reader to find what he wants. Over 40,000 copies of this edition are now in use by engineers, metallurgists, designers, production men, executives, purchasing agents and others. Order your copy of the 1948 edition today by returning the coupon below. The price is $15.00. Second copy to ASM members, $10.00.

American Society for Metals, Dept. 955
7325 Euclid Ave., Cleveland 3, Ohio

Rush me a copy of the Metals Handbook.

Name_____

Company_____

Address_____

City_____ **Zone**_____ **State**_____

☐ **Check or money order enclosed.** ☐ **Bill me.**

POSITIONS WANTED

METALLURGICAL ENGINEER: Completing studies for B.S. in February in western school. Age 29, married, one child, veteran. Prefers research or metallographic laboratory position in New York State, but willing to consider any offer. Box 11-35.

WELDING and METALLURGICAL ENGINEER: Age 37. Licensed professional engineer. Fourteen years experience in ferrous and nonferrous welding metallurgy. Extensive experience with all types of manual and automatic welding equipment and can personally operate same. Thorough knowledge welded design, fabrication methods, inspection and research. Would consider sales position. Box 11-40.

ENGINEERING PHYSICIST: M.S. degree in engineering physics, B.S. degree in chemistry, courses leading to B.S. degree in electrical and metallurgical engineering. Age 40, married, one son. Six years experience in aircraft physical metallurgy including metallography and analysis of data and electrical engineering including electronics. Currently employed as project engineer. Seven years as assistant professor of engineering physics, applied spectroscopy, electrical measurements and applied mechanics. Desires industrial or teaching position in midwest community of one million population or less. Complete references. Box 11-45.

METALLURGICAL ENGINEER: Degree, age 33, personable, married. Eight years diversified metallurgy including material and process engineering, ferrous and nonferrous heat treatment, tool, die and product lubrication, failure investigations and design consulting in medium manufacturing. Desires responsible position in peace-time industry requiring initiative and imagination. Philadelphia, New York or Buffalo preferred. Box 11-50

CORROSION METALLURGIST: B.S. degree, married. Professional metallurgical engineer, employed. Capable effecting outstanding savings for large petroleum or chemical company in process equipment, engineering materials, protective coatings selection. Will travel. Personable. Experienced in technical sales, mill processing, research, heat treating, welding ferrous and nonferrous metals, protective coatings evaluation. Box 11-55.

MATERIALS AND STANDARDS ENGINEER: Now employed by large manufacturer of medium and heavy equipment, desires responsible position in similar capacity with well-established organization. Twelve years experience ferrous and nonferrous processing, and preparation of technical standards and standardization programs for draftsmen and engineers. New England area preferred but not mandatory. Box 11-60.

TECHNICAL ADMINISTRATIVE POSITION: In laboratory, liaison, patents or sales. Physical chemist, age 26, family, six years industrial research experience. Projects on fluorides, fused salts, liquid metals, polymers, gas phase studies, radiation effects, vacuum systems. Publications, "Q" clearance. Will consider Northeast or California locations. Box 11-65.

METALLURGICAL ENGINEER: M.S. degree in metallurgical engineering, B.S. in mechanical engineering, age 30, married, three children. Experience includes five years foundry production, two and one-half years foundry research, one year teaching. Published research work. Familiar with welding research, research administration, military specifications, inspections and contracts. Excellent personal and professional references. Available early 1954. Box 11-70.

METALLURGIST: B.S. degree, age 30. Desires position in metallurgy or production metallurgy in Detroit area. Four years diversified experience in shop and laboratory. Desires responsible position with opportunities for gaining experience and advancement. Box 11-75.

METALLURGICAL ENGINEER: B.E. degree with honors and one year graduate work in industrial engineering. Age 25. One year in research on wrought magnesium alloys which consists primarily of laboratory rolling and extrusion and some work on production rolling problems. Prefers position in production, metallurgical or industrial engineering. Box 11-80.

TECHNICAL SALES REPRESENTATIVE: Married, three children, age 40, chemical and metallurgical background, 20 years diversified experience in laboratory, foundry, machine shop and sales. Capable mechanic and supervisor, experienced in equipment installation and service, good sales relations with technical and purchasing personnel in Wisconsin industries. Resume furnished. Box 11-85.

METALLURGICAL ENGINEER: M.S., B.S. degrees, chemical engineering. Married, age 27, three years sheet metal fabrication and processing. Vendor liaison work, trouble shooting. Good contact man. Some development work on refractory metals. Knowledge welding, brazing. Experience includes chemical process equipment design. Desires position as application, liaison or sales engineer. Veteran. Will relocate. Box 11-90.

BRAZING SPECIALIST; METALLURGIST: Graduate, age 36. Twelve years broad metallurgical experience including specialization in brazing most alloys of aluminum, steel, copper, nickel and magnesium employing fluxes, gases or vacuum. Ability to plan and execute projects and trouble-shoot shop problems. Author of papers. Can supervise laboratory, write lucid reports and specifications. Box 11-95.

PHYSICAL METALLURGIST: D.Sc., age 26, married. Desires research or development position in industry or a combined teaching and research post in a university. Three years experience as project leader. Will locate anywhere but prefer New York-Philadelphia-Boston area. Box 11-100.

METALLURGIST: Age 39, married. Desires location in California. Twelve years diversified experience in ferrous and nonferrous metals, including powder metallurgy, electroplating and sales. Desires responsible position in sales, service problems and contact with industry. Presently employed in permanent status with large distributors of petroleum products as sales manager. Box 11-105.

METALLURGIST: Production, research or sales. B.S. degree. Age 42. Twenty years diversified experience in all phases of manufacture, processing, fabrication and sales engineering of alloy and specialty steels, including 12 years with corrosion and heat resisting grades. Outstanding record of accomplishment. Proven administrative ability, technical writer and consultant. Wide knowledge of quality control methods. Desires responsible and challenging position. Box 11-110.

WORKS METALLURGIST: Interested in all technical problems, testing, cutting tools and dies in service, or metallurgical problems in press work lubrication. Over five years experience. Two years steel mill experience. Box 11-140.

GRADUATE METALLURGIST: M.S., B.S., Ch.E. degrees. 16 years experience in metal fabrication including forging, heat treatment, welding, machining, press forming, brazing. Three years teaching. Last 14 years as laboratory supervisor. Excellent knowledge of stainless, tool and low alloy steels. Location immaterial. Publications. Box 11-145.

METALLURGIST: X-ray diffraction. B.S., M.S., age 28, married. Four years varied industrial research experience. Desires position involving application of X-ray diffraction and metallography to metallurgical problems. Presently employed. Box 11-150.

METALLURGICAL ENGINEER: B.S., Met. Eng., Carnegie Tech. Age 32, married, family. Eleven years diversified experience in metallurgical and materials research, development and engineering. Broad interests, adaptable, mechanically inclined. Desires responsible position dealing with metallurgical aspects of engineering or production in the mechanical and/or electrical field. Box 11-155.

FOR SALE—Heat Treating Instruments. L & N Micromax-Model R—like new—0-500°F.—$100.00, or recalibrated to your needs, approximately $75.00 additional. Write—6172 Winans Lake Rd. Brighton, Michigan.

RESEARCH METALLOGRAPHER

Excellent research opening for technical graduate. Qualified candidates should have appropriate background and interest in metallography to study and develop new procedures and techniques. Investigations cover a wide variety of metals and alloys. Unusual opportunity for professional growth in a stable, progressive, independent research organization. Please apply for prompt, confidential consideration to

BATTELLE MEMORIAL INSTITUTE
505 King Avenue
Columbus 1, Ohio

MECHANICAL—MANAGEMENT—ELECTRONIC
PROCESS—DESIGN—QUALITY CONTROL
INVESTIGATIONS—APPRAISALS—REPORTS
JOHN I. THOMPSON & COMPANY ENGINEERS
921-17th St., NW, Washington 6, D. C.
LABORATORY DIVISION: BELLEFONTE, PA.

WANTED—METALLURGIST

AN EASTERN PLANT OF LARGE STEEL CORPORATION WITH WIDE PRODUCTION FACILITIES FOR VARIOUS TYPE PRODUCTS HAS OPENING FOR QUALIFIED PERSON TO HEAD UP METALLURGICAL DEPARTMENT. APPLICANT MUST HAVE BASIC AND PLATE MILL EXPERIENCE AND SHOULD GIVE AGE, EDUCATION, EXPERIENCE, AND SALARY DESIRED IN INITIAL LETTER. BOX 11-125, METALS REVIEW.

SALES POSITION OPEN

For man with metallurgical training who is a qualified airplane pilot. Will fly company-owned airplane selling heat treating equipment in middle west territory. Box 11-130.

METALLURGISTS

Would you like to work in a CHALLENGING NEW FIELD—the DEVELOPMENT of MATERIALS and PROCESSES for COMPONENTS of NUCLEAR REACTORS?

We need top-flight men at the INTERMEDIATE and SENIOR LEVEL to participate in one of the most momentous programs of this century.

MODERN LABORATORIES, SUPERBLY EQUIPPED, located in suburban Pittsburgh eleven miles southeast of the New Golden Triangle. UNIQUE OPPORTUNITY FOR GRADUATE STUDY WHILE WORKING. Housing of all types readily available in attractive communities nearby.

Write today to Supervisor, Industrial Relations, P. O. Box 1468, Pittsburgh 30, Pa.

WESTINGHOUSE
ATOMIC POWER DIVISION

WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHI
SABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORO
WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STO
WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHISABOUTBORON?WHAT'STHIS

BORON STEEL

Second Revised Edition, 1953 — Ernest E. Thum, *Editor*

Table of Contents

It's Later Than You Think, Editorial, *Metal Progress*
Saving Precious Alloys by Intelligent Use of Alternatives
Round Table Discussion, Western Metal Congress
Necessity for Further Conservation of Alloys in Steels,
by John Mitchell
Boron Steels, by Panel on Conservation,
Metallurgical Advisory Board, *D. L. McBride*, secretary
Special Carburizing Steels, Boron Treated, *by Porter R. Wray*

Record of Experience With Boron Steels

Recent Experiences with Boron Steels in Production,
by Harry B. Knowlton
Use of Boron Steel in Production of Hand Tools,
by Fred J. Robbins and J. J. Lawless
Caterpillar Tractor Co.'s Experience with Boron Steels,
by John Parina, Jr.
Forgeability, Machinability and Hardenability of Boron
Carburizing Steels, *by S. L. Widrig and Wilson T. Groves*
Distortion and Service Tests of Carburized Gears
Made of Boron Steels, *by S. L. Widrig and Wilson T. Groves*
Processing of Boron Steels in the Shop, *by G. D. Rahrer*
Boron Steel in Through Hardened Parts for Truck Axles,
by T. A. Frischman

Effect of Boron on Steel

Summary of Laboratory Investigations, *by The Editor*
Medium-Carbon Boron-Treated Steels,
by R. N. Imhoff and J. W. Poynter

Supplement on Hardenability Test, H-Steels, and Their Use

Standard Hardenability Test, *Data Sheet*
Appraisal of Steels by Their Hardenability, *by Walter E. Jominy*
Hardenability Control for Alloy Steel Parts, *by A. L. Boegehold*
Selection of Steel for Automobile Parts, *by A. L. Boegehold*

$1.00 per Copy

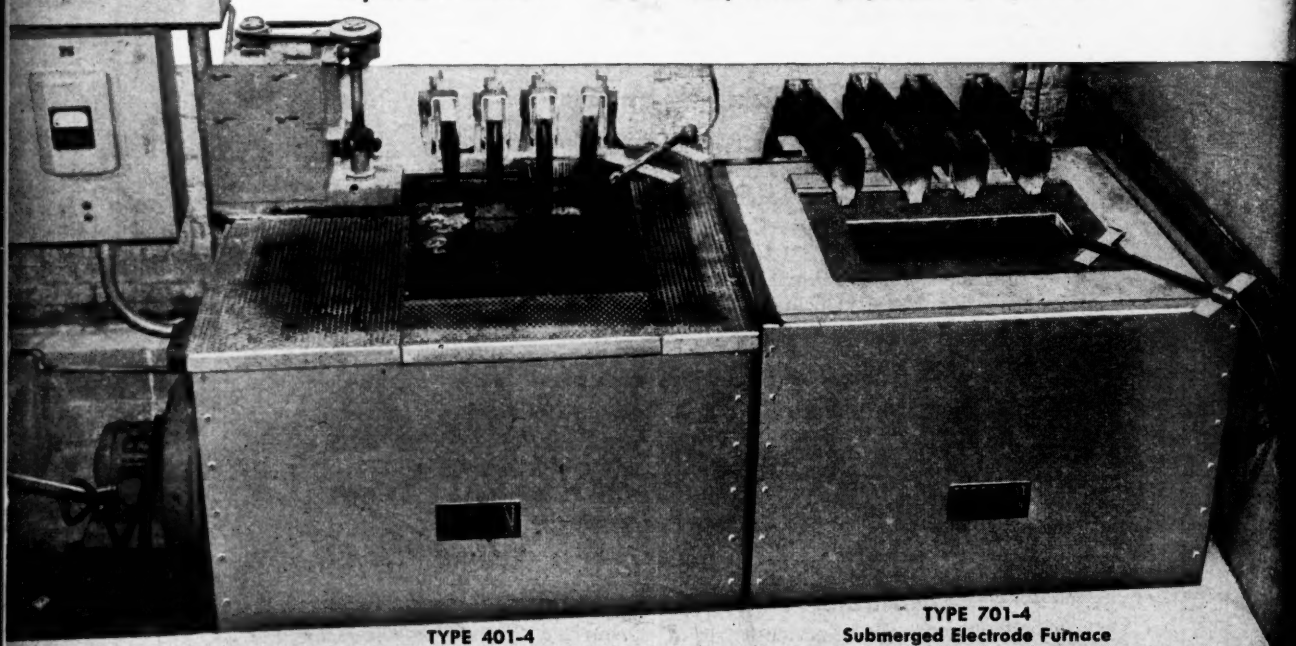
American Society for Metals
7301 Euclid Ave., Cleveland 3, Ohio

MORE FOR YOUR MONEY

HOLDEN Marquenching and Austempering Furnaces and Salt Baths

Provide these Important benefits

1. Less distortion
2. Improved wearing properties
3. Improved physical properties



TYPE 401-4
Marquenching-Austempering Unit

TYPE 701-4
Submerged Electrode Furnace with removable electrodes.

Investigate These Holden Products For Improved Marquenching

Holden Marquenching #296

1. This new salt contains a coagulating material which separates out chlorides.
2. Your melting point quenching rate can be maintained under any production operating conditions.
3. Therefore, sludges are easily removed as soft residual material.
4. This product can be used in Holden Marquenching Units and competitive furnaces.

Marquench Additive #356

Marquench Additive #356 can be added to your present salt quenching furnace as a separate item as a coagulant. You can buy the coagulating material for competitive quenching salt baths and similarly add the new Holden Marquench #296, which will definitely eliminate the need for throwing away the quenching salt, and at the same time, you obtain more uniform quenching.

Write for 7-Page Austempering-Martempering Bulletin

INVESTIGATE THE HOLDEN LEASE PLAN

1. It will save you **one-third** over direct purchase and depreciation.
2. No capital investment required.

For full information, write or phone:

J. B. Carey—Detroit
Texas 4-8127

M. R. Boyle—New Haven
State 7-5885

THE A. F. HOLDEN COMPANY

THREE F.O.B. POINTS — LOS ANGELES, DETROIT and NEW HAVEN

P.O. Box 1895
New Haven 8, Conn.

3311 E. Slauson Avenue
Los Angeles 58, Calif.

11200 Schaefer Highway
Detroit 27, Michigan